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ABSTRACT

One of a series of sixteen knowledge transformation papers, this paper represents a comprehensive study of the nature and types of impact evaluation available to vocational administrators, researchers, and evaluation experts. After explaining the concepts of the CIPP (context, input, process, product) model, of summative evaluation and the value of using comparison groups, of efficiency vs. effectiveness, of intrinsic vs. pay-off evaluation, and of impact evaluation vs. research, the first section concludes with a working definition of impact evaluation. The next section discusses the importance of this type of evaluation, especially in relation to federal legislation which requires data collection and reporting, planning, and evaluation to provide accountability. Next, current evaluation practices are reviewed to show their strengths and weaknesses. On-site visitation, evaluation of student competencies, and follow-up evaluation are analyzed in depth. The fourth section focuses on current developments such as evaluation models for states, a vocational education study conducted by the National Institute of Education, the role of the National Center for Research in Vocational Education, and various national surveys like the National Longitudinal Surveys. Following a prognosis for the future of impact evaluation, the paper ends with a lengthy bibliography. (ELG)

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Information Series No. 157

# IMPACT EVALUATION IN VOCATIONAL EDUCATION:

# THE STATE OF THE ART

written by

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1979

U S DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION

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* Generating knowledge through research
* Developing educational programs and products
* Evaluating individual program needs and outcomes
* Installing educational programs and products
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## FOREWORD

Program improvement and accountability demands placed on vocational education programs and personnel make the topic of impact evaluation extremely timely. This paper represents a comprehensive study of the nature and types of impact evaluation available to vocational administrators, researchers, and evaluation experts. It includes a working definition of impact evaluation applicable to vocational education, a discussion of reasons for the importance of this type of evaluation, an analysis of existing models, a description of developments in this area, and a prognosis.

"Impact Evaluation in Vocational Education: The State of the Art" is one of 16 papers produced during the first year of the National Center's knowledge transformation program. The 16 papers are concentrated in the four theme areas emphasized under the National Center contract: special needs subpopulations, sex fairness, planning, and evaluation in vocational education. The review and synthesis of research in each topic area is intended to communicate knowledge and suggest applications. Papers should be of interest to all vocational educators, including administrators, researchers, federal agency personnel, and the National Center staff.

The profession is indebted to Dr. John T. Grasso for his scholarship in preparing the paper. Recognition is also due Dr. Donald L. Clark, Texas A & M University, Dr. James E. Wall, Mississippi State University, and Dr. William Hull, the National Center for Research in Vocational Education, for their critical review of the manuscript. Dr. Carol P. Kowle, research specialist, supervised the publication of the series. Ms. Jo-Ann Cherry coordinated editing and production.

Robert E. Taylor
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## INTRODUCTION

Professionals in vocational education need to be knowledgeable about the strengths and weaknesses of evaluation. Even if they do not participate directly in evaluations, they can offer support to those engaged in such work in their local areas or elsewhere, and recognize opportunities for using relevant findings in their programs. Findings can be used for effective decision making, and for informing students, parents, taxpayers, and legislative representatives about the effect of vocational education.

Impact evaluation is an emerging type of evaluation-research that can be used in vocational education for achieving the highest quality programs. This type of evaluation can be used to document the effectiveness of existing programs, to suggest improvements, and to satisfy accountability needs. In this regard, the author considers vocational education as an intervention having consequences for consumers and society which need to be assessed through impact evaluation.

The discussion will be limited to issues in assessing the impact of programs upon students and society. This limitation excludes a variety of other possible applications of impact evaluation, for example:

1. In investigating the impact of new methods of preparing vocational educators in teacher education programs

2. In examining the impact of federal monies on the existing vocational education establishment in a state

3. In exploring the impact of selected efforts in vocational education research and development

It should be noted that impact evaluation is not a specific methodology with a recipe to be followed. There are various methods for assessing the consequences of vocational education for students and society that can be used in impact evaluation. Therefore, the awareness of the nature and usefulness of impact evaluation should be increased by reviewing issues in evaluating vocational education. The bibliography that follows the text suggests items for further study.

## IMPACT EVALUATION: WHAT IS IT?

At this early stage students of evaluation theory and practice have not yet agreed upon a uniform definition for the term "evaluation." The rapid emergence of new developments in theory and methodology should deter premature closure on discussion. This makes it necessary to review a diversity of concepts in evaluation in order to trace the emergence of impact evaluation.

## The CIPP Model

Stimulated by the mandate for program evaluation in the Elementary and Secondary Education Act of 1965, the Phi Delta Kappa National Study Committee proposed a model for program evaluation using the following definition: "Evaluation is the process of delineating, obtaining and providing useful information for judging decision alternatives" (Stufflebeam et al., 1971, p. xxv). Four types of evaluation were identified to correspond to four different types of decision-making needs. They are as follows:

1. Context evaluation: defines the environment and diagnoses existing problems, thereby identifying unmet needs and unused opportunities, in order to facilitate planning decisions

2. Input evaluation: identifies and assesses capabilities and the merits of various strategies and implementation designs for forming decisions on the optimal utilization of resources for achieving goals

3. Process evaluation: reviews the operations of programs to generate feedback information to (1) detect defects in design or implementation, (2) provide information for midstream decisions, and (3) accumulate documentation

4. Product evaluation: measures and interprets attainments at the end of a project cycle (and during the project term as needed) to assess achievement of goals

The CIPP model (Context, Input, Process, Product) is well-suited for use by managers and administrators for planning, organizing, directing, and controlling ongoing programs.

However, dictionary definitions of impact relate the term to the power to produce a change in condition. Evaluating the impact of vocational education programs requires a clear conception of the program as an intervention which causes desirable changes among its consumers by satisfying needs, addressing unmet needs, and alleviating problems in society.

Drewes and others (1975) attempted to adapt the CIPP concepts to vocational education but found it necessary to expand the scheme to include a separate "impact" component. Their purpose was to classify typical questions asked in vocational education. The following six categories of information were suggested:

1. The context in which vocational education occurs
2. The inputs into vocational education
3. The process by which vocational education staff and facilities are structured and organized into programs to provide services
4. The product or output of vocational education programs, that is, program completions and withdrawals
5. The impact or result of vocational education, such as postprogram placement and satisfaction
6. The pairwise interrelationships between context, input, process, product, and impact elements

This represents a beginning step, although more work is needed to clarify how various types of evaluation activities could be organized to produce the required information. Those engaged in future work need to consider a larger set of questions and information. For instance, the "impact" category was limited to a few items on postschool employment, employer satisfaction, and the satisfaction of alumni with their school programs and postschool jobs. This implies that questions on impact can be answered from the information that is already available from follow-up surveys. However, such surveys are not designed to investigate both intended and unintended consequences of programs, nor are they easily adapted to studies of how results occur or fail to occur.

## Summative Evaluation

Scriven (1967) uses the terms "formative" and "summative" to distinguish between two types of evaluation activities with different purposes. In a curriculum research and development project, the activities comprising the formative evaluation are designed to improve the curriculum during its development. Those of the summative evaluation are designed to determine whether the finished curriculum package "represents a sufficiently significant advance on the available alternatives to justify the expense of adoption by a school system" (p. 42).

Actually the terms "formative" and "summative" have been used in a variety of ways. Stake (1967) perceives formative evaluation as oriented to curriculum developers, authors, and publishers; and summative evaluation as oriented to consumers, administrators, and teachers. Stufflebeam (1974) relates formative evaluation to decision making and summative evaluation to accountability. Bloom (1969) associates formative evaluation with providing "feedback and correctives at each stage of the teaching-learning process" (p. 48), to aid in learning; and views summative as being used "at the end of a course, term, or educational program" (p. 47), to demonstrate achievement of mastery, or the attainment of instructional objectives.

Scriven (1967) portrays the summative evaluation of a new curriculum package as investigating the net advantage of this package compared to other alternatives. Similarly, studies on the impact of vocational education programs upon students and society should be concerned with the net advantage of the programs in question, but this requires explicit recognition of relevant alternatives.

The issue was clarified by Kievit at the 1978 National Conference on Outcome Measures for Vocational Education, Louisville, Kentucky. In discussing the personally and socially valued outcomes of vocational education, Dr. Kievit stated: "The issue is not whether these values might not have been attained by other means--they probably would to some degree, but rather to demonstrate that vocational education is one means among others, equally effective in most cases, and more effective than other means in some cases" (p. 25).

In fact, the problem in impact evaluation in vocational education is to produce credible evidence from at least one of several possible points of view. The

minimum requirement is to clearly attribute an observed outcome to the vocational program. Therefore, at least one comparison or control group must be used. According to Campbell and Stanley (1963):

> Much research in education today conforms to a design in which a single group is studied only once, subsequent to some...treatment presumed to cause change...such studies have such a total absence of control as to be of almost no scientific value...securing scientific evidence involves making at least one comparison. (p. 6)

Whenever this criterion is not satisfied, discussing the findings in terms of impact of the program is not justified. For example, much of the evidence on job placement rates is open to criticism because of failure to consider whether the persons might have obtained the same jobs without any vocational program.

Moreover, the credibility of the evidence rests upon the comparison that is employed; for example, before-and-after or treatment-versus-control groups (Campbell and Stanley), and upon the care and precision with which it is carried out. For example, were the vocational graduates more highly motivated than the control group? At the high school level, simple comparisons could be drawn between vocational alumni and persons from the general and/or college preparatory curricula; more complex comparisons would also control for differences in ability, motivation, and other factors.

More credible evidence from increasingly demanding perspectives would require assessing the impact of the intervention programs versus alternative programs; here the evidence is comparative. This level of comparison differs from the earlier one, which implicitly compares results between those who did participate in a specific vocational program and those who did not. The more demanding type of comparison involves groups who have participated in different types of "programs." For example, comparative evidence about high school level vocational education could involve comparison between vocational alumni and non-vocational graduates who participated in (1) on-the-job training, (2) manpower and youth employment training, (3) postsecondary and proprietary schools, and (4) training conducted in military service.

Researchers must account for the possible influence of other factors, such as different populations and differential motivation. Nevertheless, credible findings of this type can be useful for decisions about the allocation of resources among competing programs. The decisions would also require comparative information on costs, on the potential for service to special populations, and on other outcomes of the programs being compared. Ideally, cost-benefit studies would be useful for comparing competing programs on the basis of their pay-offs. Rivlin (1971) discusses the actual usefulness of cost-benefit studies.

Assessment of worth or merit is an essential factor in evaluation. Popham (1974) has stated that "systematic educational evaluation consists of a formal assessment of the worth of educational phenomena" (p. 8). At the same

time, the assessment of merit or worth of a program should not be interpreted as an assessment of the merit or worth of its goals, or of the staff of the program.

## Evaluating Effectiveness and Efficiency

The analysis of the effectiveness of a program is an investigation of the extent to which predetermined and desired results are produced. Accordingly, effectiveness studies should have common features with impact evaluation. However, impact evaluation should be concerned with intended and unintended outcomes, including desirable or undesirable results.

The term "efficiency" encompasses more than effectiveness, as it designates attainment of desired outcomes with minimum expenditures of resources. It is not meaningful to describe a program as being both efficient and ineffective. The inclusion of both effectiveness and effort in the term "cost-effectiveness" make it synonymous with efficiency. However, impact evaluation does not, by itself, involve consideration of resource levels.

## Pay-off Evaluation

Scriven (1967) also proposes a distinction between "intrinsic" and "pay-off" evaluation. Intrinsic evaluation of a program involves an appraisal of the goals, content, and procedures of the program. An intrinsic evaluation of a vocational education program would involve a review of objectives, methods, materials, staff, and facilities. Therefore, intrinsic evaluation requires the formulation of standards for methods, materials, and other components which can be conceived as intermediate evaluation criteria. The intermediate criteria for intrinsic evaluation are very important, and the relationships between satisfying intermediate criteria and achieving overall goals must be clearly specified.

In spite of the weaknesses, intrinsic evaluation remains valuable because of the importance placed on intermediate criteria. If a program review can demonstrate that many aspects of the program are considered to be successful, that the program seems to be personally satisfying to students, parents, and teachers, and that craft committees and other visiting review groups are favorably impressed, then this is meaningful evidence about the program. Indeed, Jencks and his colleagues (1972), claiming that education does not and cannot produce economic or social equality, suggest that schools should be judged on diverse standards, and especially on the quality of life that pupils and teachers experience in them. Although intrinsic evaluation is worthwhile, it is incomplete as a strategy for impact evaluation.

Pay-off evaluation examines criteria by assessing the program through its effects upon students, for example, employment outcomes. Scriven (1967) suggests that proponents of pay-off evaluation "would support their approach by arguing that all that really counts are the effects of the course on the pupils" (p. 54).

Since pay-off evaluation seems conceptually similar to impact evaluation, it is important to note three limitations of pay-off evaluation.

1. In a multigoal program such as vocational education, it is difficult to formulate the complete set of evaluation criteria that an adequate pay-off assessment would require. Evaluators claiming to assess pay-off may be criticized for failure to address important outcome domains.

2. In education evaluation it is frequently difficult to identify defensible operational criterion measures in each of the important outcome domains, for example, the problem of formulating an adequate measure for assessing whether students have gained a "better understanding" of curriculum materials.

3. By itself, pay-off evaluation fails as Scriven (1967) suggests "to distinguish between importantly different explanations of success or failure" (p. 60).

William Foote Whyte (1972) stated that:

> It does us no practical good to know that a given training program reached a certain objective unless we can also discover what features of that program contributed toward that objective. Only as we make these observational studies, can we have some confidence in being able to reproduce a program that has proven effective. (p. 284)

Similarly, cost-benefit studies, which comprise a type of pay-off evaluation, are criticized because the cost-benefit ratio tells us little about how a successful program can be replicated, or how a faltering program might be improved.

## Impact Evaluation Versus Research

Evaluation is designed to serve decision making for program improvement. This emphasis is said to distinguish evaluation from research (Worthen and Sanders, 1973). Evaluators are motivated primarily to emphasize worth or merit of programs, curricula, and materials, and decision making about educational policy and practice. Researchers try to produce conclusions that can be generalized in the process of discovering truth.

Although the distinction between evaluation and research may seem clear, clarity is lost in applying the distinction to increasingly complex terms in the literature: "evaluation research," "policy research," and "social action research." These terms are also used to describe analyses of the effectiveness and, more broadly, the intended and unintended outcomes of policy and programs. It may be said that these terms are "broader" than program evaluations due to their emphasis on attempts to discover what elements of programs, and/or what kinds of programs, work for what groups, while the scope of program evaluation is

thought to be limited to the analysis of designated programs. However, impact evaluation should be concerned with what works, for whom, and under what conditions, and all the possible outcomes.

The distinction between evaluation and research on the basis of methodology is also unclear. Stufflebeam and associates (1971) argued that available research methodology in the form of experimental design is not only inadequate for evaluation purposes, but in many respects is inappropriate. Debates over appropriate evaluation methodology have continued over two decades, as the following examples illustrate:

> Estimating the impact of education upon educational outcomes: Coleman et al. (1966); Bowles and Levin (1968); Smith (1968); Coleman (1968); Cain and Watts (1968 and 1970); Coleman (1970); Harvard Educational Review (1969); Leucke and McGinn (1975); Mosteller and Moynihan (1972); Spady (1973); Herriott and Muse (1973); and Pedhazur (1975)
>
> Estimating the impact of Head Start and follow-through: Cicirelli et al. (1969); Rossi and Wright (1977); Datta (1976), and references therein; House et al. (1978); Anderson et al. (1978); Wisler et al. (1978); and Hodges (1978)
>
> Estimating the impact of education on social and economic outcomes: Jencks et al. (1972); Berg (1971); Eckaus (1973); Harvard Educational Review (1973); and Thurow (1975)

Where new programs are concerned, some authors continue to call for modified experimental design (Meigs, 1975; Rivlin and Timpane, 1975), while others remain skeptical about the application of the scientific method in evaluating human service programs. Still others are striking out in new directions: Aptitude and Treatment models (Cronbach et al., 1976), Bayesian methods (Fennessey, 1976), Production models (Barnow, 1976), and Ethnomethodology (Patton, 1975).

## Definitions of Impact Evaluation in Vocational Education

The elements of a working definition of impact evaluation in vocational education are as follows:

1. Conception of vocational education as an intervention stresses the need to assess the consequences of programs upon students and society.

2. Inclusion of intended and unintended results, desirable and otherwise, emphasizes the wide range of consequences to be assessed.

3. Assignment of results clearly due to the programs requires the use of valid scientific methodology.

4. Recognition of how results occur or fail to occur is necessary to guide decisions on both successful programs and those needing improvement.

Therefore, a working definition of impact evaluation can be stated:

> Impact evaluation in vocational education conceives vocational education to be an intervention, having consequences for consumers and society which are to be assessed, by producing information on intended and unintended outcomes attributable to the program, including both desirable and other results, and illuminating how these occur, for the purpose of satisfying decision making and accountability needs.

## IMPACT EVALUATION: WHY IS IT IMPORTANT?

Vocational educators conduct impact evaluation in order to (1) improve vocational education programs, (2) satisfy accountability needs, and (3) fulfill the requirements of legislation. The first two reasons are legitimate purposes for impact evaluation.

"Improving vocational programs" can include expansion of successful programs, revision of programs, and termination of programs.

Findings from impact evaluation can satisfy accountability needs by informing various audiences about the effects of vocational education programs.

The third reason, legislative requirements, reflects the need for program improvement and accountability. This perspective depends on the interpretation of Congressional intent and the classification of prescriptive legislative provisions according to the working definition of impact evaluation in vocational education. Three major areas, data collection and reporting, planning, and evaluation, illustrate the concerns of the legislation.

### Data Collection and Reporting

The Vocational Education Act of 1963 was considered a landmark piece of legislation because it increased funding and broadened the definitions of federally reimbursable programs. The provisions of the act resulted from a report of the the Panel of Consultants on Vocational Education appointed by the President in 1961. The panel reported that it was hampered in its deliberations by incomplete, noncomparable, and inadequate data concerning vocational education; for example, enrollments, completions, placements, and expenditures. The panel made the following recommendations for improvement:

> To develop a statistical data reporting system covering enrollments and outcomes and indicating the need for continuing existing programs and for developing new programs, and to assist the states in developing criteria to evaluate programs, to provide the basis for improving programs and to gauge the progress of expanding and changing programs. (Department of Health, Education and Welfare, 1963, pp. 250-251)

The Vocational Education Act of 1963 also required the establishment of an Advisory Council on Vocational Education in 1966 to evaluate the results of the act, and to report, with recommendations for improvement, by January 1968. However, Evans, Mangum, and Pragan (1969) reported that:

> As the first advisory council on vocational education, we have found it impossible to determine to our full satisfaction what has occurred under the Act....Despite the long foreknowledge of the 1966-67 assignment, no significant studies were undertaken with adequate leadtime to produce data for the council's needs. (p. 38)

Instead, the council found "gaps in statistical data, deficiency in depth of reporting, as well as the lack of adequate standards for evaluation of performance" (p. 39). The council stated that primary responsibility for these problems rests at the federal level and with the leadership of vocational education.

Stimulated by the 1963 and 1968 legislation, many states assumed responsibility for improving their reporting practices. In most states, new or revised management information systems were developed (Starr et al., 1977; Geigle, 1978). The incomplete resolution of reporting problems, however, was apparent in hearings prior to the 1976 education amendments. For instance, Arthur Lee, Director of Project Baseline, testified that the lack of adequate data, in part, was the failure of the U.S. Office of Education to require complete and proper data from the states, as well as a lack of uniformity of definitions underlying the data being reported (Committee on Education and Labor, 1976). These concerns led to the provision in the 1976 amendments requiring the National Center for Education Statistics to develop and implement the Vocational Education Data System, VEDS. The implementation of VEDS should provide further improvement in reporting practices and result in more adequate data on enrollments, completions, and placements.

Unfortunately, VEDS has nothing in common with "impact evaluation." The component in VEDS related to measuring impact is the collection and reporting of placement data. Data on the extent of employment with training-related occupations provide <u>at best</u> very weak, and <u>at worst</u> misleading, information on impact, because of the ambiguity of interpretation. Indeed, any placement data for a single specialty program should be interpreted in the context of such factors as:

1. The timing of the follow-up upon which the data are based
2. The method of data collection, that is from the graduates directly, or from teachers or counselors
3. The definition of training-relatedness
4. The economic conditions facing the graduates, and their responses to employment opportunities by means of changing fields or relocating geographically

In addition to these factors in programs for entry level skills, the graduates may have been enrolled for diverse purposes, including avocational reasons.

These and other considerations place limitations on the interpretation of placement reports as information on impact.

## Planning

In preparing for the 1976 amendments, the Committee on Education and Labor was distressed by reports from the Government Accounting Office (Comptroller General, 1974) and from the Center for Occupational Education, North Carolina State University (Drewes and Katz, 1975), that planning in most states was not coordinated among the several agencies providing education and training, and that the existing planning mechanisms were not based upon data concerning projected manpower needs. As a result, the 1976 amendments contain prescriptive provisions for the coordinating of planning and use of manpower data. However, reviewing manpower data suggests the data is unrelated to the impact of vocational education.

The manpower requirements approach to planning vocational education programs finds its rationale within the legislative mandate to provide training that is realistic in terms of opportunities for gainful employment. Methodology for educational planning to meet manpower requirements, applied in the Mediterranean Regional Project of OECD (Parnes, 1964), has been adapted to identify the relevant employment opportunities.

In the Mediterranean project, manpower planning was undertaken to avoid inadequate supplies of skilled manpower during economic development. Such an application presupposes national goals, such as desired rate of growth in GNP, from which industrial and occupational manpower "requirements" are derived and then compared to anticipated levels of manpower supply or projected graduates. Estimated discrepancies between desired and expected manpower supplies are then considered for planning expansions of education and training systems.

The application of manpower planning to vocational education differs from the Mediterranean project in important ways. The motivation is to locate relevant job opportunities for persons assumed to need some type of training and thereby discover the types of training that should be offered. Economists have challenged this assumption on three points:

1. Assuming that persons will need some training, it may still not be necessary to plan in advance to offer specific programs except for occupations involving levels of skill that require long periods of training.

2. Assuming that it is possible to identify the specific types of training that will be needed, it may not be necessary to plan publicly-supported programs. Adjustments in the market encourage workers to obtain useful skills or employers to provide the needed training without public outlay.

3. Granting the need for public support, public provision of the training may not be necessary. Student aid or direct subsidy to institutions can provide the needed training by regulated proprietary schools (Nolfi et al., 1977, chapters X and XI).

There are valid reasons for a limited role for manpower forecasts in planning vocational education programs. Young and others (1971) argue that simply knowing the occupations having large numbers of openings is not all that is relevant to decision making. Many occupations such as clerical, allied health, and service occupations have high turnover characteristics because of abnormally low rates of pay. Students may also continue to enroll in vocational courses for other than vocational reasons, for example, automobile and airplane mechanics. Although the number of projected net openings should be considered in program planning, many other factors are also important, such as entry-level wages, wages at seniority, student interests and desire to relocate, job satisfaction of occupational incumbents, employer and job entry requirements, program costs, and the potential for service to special student populations. Moreover, this assumes that manpower projections are accurate (Stevens, 1976) and can clearly be related to specific vocational programs.

However, planning programs is clearly different than assessing the impact of programs upon students and society. Therefore, the requirements for planning in the 1976 amendments should not be confused with the need for impact evaluation.

## Evaluation

The third area of emphasis in the 1976 amendments consists of prescriptions for evaluation. The rationale for this is found in the Committee on Education and Labor report (1976, p. 20). As stated earlier, the legislative requirements for VEDS and Section 112(b) evaluations do not necessarily imply impact evaluation.

However, other provisions of the legislation bear more directly on the need and opportunity for impact evaluation. First, Congress requires the state advisory councils to "evaluate vocational education programs, services and activities assisted under this Act, and publish and distribute the results thereof" [Sec. 105 (d)(2)]. Second, the states are required to submit annual planning and accountability reports to the Commissioner. Such reports must contain, in addition to the placement and employer data provided in Sec. 112 (b)(1)(B), more stringent evaluation under Sec. 112(b)(1)(A), namely:

> Each State shall...evaluate the effectiveness of each program within the State being assisted with funds available under this Act; and the results of these evaluations shall be used to revise the State's programs, and shall be made readily available to the State Advisory Council.

This section is interpreted in the Federal Register as including:

(a) Planning and operational processes, such as

(1) Quality and availability of instructional offerings
(2) Guidance, counseling, placement, and follow-up services
(3) Capacity and condition of facilities and equipment

(4) Employer participation in cooperative vocational programs
(5) Teacher/pupil ratios
(6) Teacher qualifications

(b) Results of student achievement, as measured by standard occupational proficiency measures or other methods

(c) Results of student employment success, such as wages, employment and unemployment, and employer satisfaction

(d) Results of additional services, including service to special populations (October 3, 1977; Section 104.402)

All of the foregoing imply impact evaluation.

Third, the states' annual applications will:

(a) Describe the vocational education needs of potential students in the area or community...and indicate how, and to what extent, the program proposed in the application will meet such needs, and

(b) Describe how the findings of any evaluation of programs operated by such applicant during previous years...have been used to develop the program proposed in the application. [Sec. 106 (a) (4) (B)]

These evaluation requirements imply the need for evidence on impact that is not ambiguous and is of adequate quality for planning. The law does not specify or define "impact evaluation," or require the states to use selected statistical methodology or specific sampling techniques. The emphasis is to require the type of evaluation that produces valid and reliable findings for decision making and accountability.

The Congress has promoted and supported vocational education since the Smith-Hughes Act of 1917. In writing about the implications of the latest act, Stevenson (1977) declares the Education Amendments of 1976 to be the most prescriptive provisions in history, and concludes that "Congress has assumed responsibility for molding the shape of vocational education for the future" (p. 2). However, even the Smith-Hughes Act of 1917 specified that:

> To participate in the benefits of the legislation, the States were required to...prepare a State plan showing the programs they intend to provide (and) make an annual report to the Federal Board for Vocational Education showing the work done during the year. (Department of Health Education and Welfare, Panel of Consultants, 1963, p. 22)

Thus, the precedents for Congressional promotion of data collection and reporting, planning, and evaluation are more than fifty years old. While some persons may conceive the present formulation to be a burden, others view it as a logical consequence of an evolutionary process covering more than a half-century of federal involvement.

## CURRENT EVALUATION PRACTICES

It is necessary to review existing evaluation practices in vocational education in order to discuss their relationship to impact evaluation. According to our working definition of impact evaluation in vocational education, its purpose is to satisfy decision making and accountability needs. States that perform impact evaluations, that use findings for program planning and improvement, and that publish documentation of the evaluations and their use are being responsive not only to the provisions of the 1976 education amendments but to their clients and to the general public.

It is important to understand the strengths and weaknesses of the evaluation models that are now in use. Ambiguous evidence from weak evaluation designs is not suitable either for facilitating decision making or for satisfying accountability needs. Moreover, the amount of funds available for research and evaluation is small in comparison with the many competing needs in education. Proposals for funds for impact evaluation should be carefully evaluated for their potential for building a strong, long-term compatibility for impact evaluation in vocational education.

### "Evaluation" Reporting

Vocational education exists for providing education and training to students, and the number of students that are served constitutes an indication of the success of programs. Indeed, the 1976 amendments envision that:

> Persons of all ages in all communities of the State, those in high school, those who have completed or discontinued their formal education and are preparing to enter the labor market, those who have already entered the labor market, but need to upgrade their skills or learn new ones, those with special educational handicaps, and those in postsecondary schools, will have ready access to vocational training or retraining. (Sec. 101)

Data are needed to show service to special populations. Regardless of the need for information on the extent of service and of the benefits of improved management and reporting systems, the enumeration of students does not constitute evidence of the impact of programs. The size of current or previous enrollments bears no necessary relation to program quality or effectiveness.

Indeed, the management information systems being developed to improve reporting practices may fail to contribute, directly or indirectly, to impact evaluation. In a Rand Corporation Research Study, Coleman and Karweit (1972) set out to study administrative data systems in education "with the aim of designing computerized systems which would facilitate such administration, and also provide data for research and evaluation purposes" (p. ix). They were especially interested in information "about the exposure of students to possibly effective educational environments" (p. 6). However, they discovered that "systems must

be appropriately designed from the outset to bring the power of the information to bear on education decisions" (p. 4). Otherwise, that data might be unsuitable.

Even when carefully designed, information systems may fail to produce the anticipated benefits. Lucas (1975) studied many information systems that "would have to be classified as failures. If a system is not used, it cannot be considered a success even if it functions well technically" (p. 5).

In order for more information systems to be useful in impact evaluation, they must contain the type of systematically-collected and well-organized information that can form the basis for longitudinal files of the progress of each student through a program. Questions for which such information may be useful include:

1. How many students are enrolled in the program of their first choice? Second choice?

2. What are the educational goals of current students?

3. Within each program, how many students are definitely planning to pursue careers related to their programs? How many students subsequently change?

4. What is the basis for their enrollment in the program? Of those who report career interests, what is the extent of their knowledge of career opportunities? What is the validity and reliability of the career information they possess?

Research in Pennsylvania has verified the feasibility of collecting and using such information in assessing the impact of programs (Impellitteri and Kapes, 1971; Kapes et al., 1974). Kapes and associates (1974) have reported that the information proved useful in addressing the concern that many outcome studies focus on postschool experience while failing:

> To provide information regarding the nature of the inputs to the vocational education program (the type of youngster who typically selects such programs) so that valid inferences regarding effects of the program can be made. (p. 6)

In Fall of 1968, 100 percent samples of ninth-graders in public high schools were selected within three large school districts. Longitudinal files were accumulated with follow-up data during and after high school. The data files contain scores on a variety of demographic variables, test batteries, interest inventories, and performance measures. The results have been used in more than 20 completed studies on such topics as the stability of occupational goals (O'Reilly, 1973). Herr et al. (1975) have also used the data to show the relationship between high school experiences and postschool success and satisfaction. Special reports have also been written for the participating districts.

A substantial amount of work on vocational education has been completed with the large surveys (Grasso and Shea, forthcoming a and b) because of the ready availability of background and other required information.

In local education agencies, student record files and school record files may contain relevant data. The absence of systematically collected comprehensive information on vocational students, and on the larger population from which they were drawn, may discourage impact evaluation. In such a situation impact would be difficult to analyze because of the inability to separate program effects from preexisting differences.

Therefore, it is also important to understand the process by which students choose a vocational program, or are tracked into curricula, or change curricula during enrollment. Searches of documents in ERIC and NTIS have uncovered little work on these topics. Yet their importance is evident in the following examples of existing evaluation studies:

1. A haphazard system of intake may have negative consequences in terms of rates of "noncompletion." Consider this from a study of vocational education:

   > This points to one of the basic flaws in the provision of vocational education in New York State outside the large cities. The control of the flow of students...is totally beyond BOCES (Board of Cooperative Education Services)....What coordination and articulation there is between BOCES offerings and sending school offerings is voluntary and at the discretion of the sending schools. What contract there is for recruiting students...is at the discretion of the sending school....This has resulted in uninformed parents, students and teachers, overlap of courses, violently fluctuating enrollments in vocational courses, and an inability by BOCES to predict and plan. (Swanson, 1976, p. 51)

2. Studies based on student data ranging from national survey data (Grasso and Shea, forthcoming a and b; Jencks et al., 1972) to case studies (Rosenbaum, 1976) show that relatively high proportions of noncollege preparatory students are desiring to go to college. According to one author, a reason is that "the choices made by parents and students are not likely to be free and informed choices" (Rosenbaum, 1976, p. 124). Such points would appear to have implications for several traditional outcome measures of "success."

3. The extent to which students change from one curriculum to another will affect findings on the effects of curriculum by undermining the validity of the curriculum measure. For instance, if the general program does not serve a student well and the student transfers belatedly to a vocational program, then a follow-up of this "vocational" graduate may not only conceal the shortcomings of the general program, but fail to reflect the reputed benefits of participation in a complete vocational program.

4. The timing of curriculum choice varies among districts and states, and in some cases, within districts. The failure to recognize this in studies of the impact of vocational education on the dropout rate can lead to fallacious conclusions. An exemplary study based on adequate student record data would attempt to conceptualize two distinct "effects": the power of vocational programs to attract youth who are considered to be likely to drop out and the holding power of the curriculum. An implication is that studies that show results favorable to vocational education may be viewed skeptically by researchers because of the treatment of cases of youth who left school prior to the time when enrollment in a vocational program was permitted. They frequently are classified as dropouts from the general curriculum, but may also be classified as those whom the vocational program failed to attract.

These examples suggest the need for comprehensive student and school records in order to permit the application of adequate evaluation designs.

## Evaluation by Site Visitation

The on-site visitation is a widely accepted method of assessing program quality which, in several respects, resembles intrinsic or process evaluation. The on-site team examines materials, curriculum, equipment, and techniques on the basis of standards that may be regarded as intermediate evaluation criteria, or attempts to observe whether the program is conducted in agreement with its goals and objectives. The American Vocational Association has developed an evaluation model patterned after educational accreditation studies (Ash, 1973) that consists of many intrinsic and process evaluation components. Most states employ this type of evaluation.

Comprehensive evaluation systems would include both on-site and impact components. However, on-site visitations do not constitute impact evaluation.

## Evaluations of Student Competencies

Student competence is one factor in impact evaluation which determines the consequences of the program for the student. Criteria consist of all the proximate effects of the program, including cognitive, psychomotor, and affective outcomes (Wentling and Lawson, 1975, chapter 3). These proximate effects, such as occupational skills, constitute the means by which the student may achieve long-range goals.

Programs for entry level job skills should be evaluated on the knowledge and skills that are the minimum behavioral objectives of the instructional program. Criterion measures may be the results of locally designed or standardized written tests and performance tests (Erickson and Wentling, 1976). At the local level, findings may be compared with minimum standards to determine the proportion of students achieving mastery. At district or state levels, variations in

program sites offer the opportunity for statistical analysis that could demonstrate the effects of various program components upon student competencies, such as duration and intensity of program, combinations of classroom and experimental teaching, and use of materials and equipment. Such analyses should be verified by pilot experimentation. Extensive revisions on the basis of correlational data may be unwise.

Instruments for assessing job knowledge and generally useful labor market skills from the National Assessment of Educational Progress (NAEP) can be adapted for impact evaluation (Ahmann, 1977). NAEP data have already proven useful in research on race and sex occupational stereotyping (Gottfredson, 1978). Also, instruments for assessment of career education programs might be adaptable for measuring labor market knowledge and job-finding skills.

Types of knowledge and skills other than in the specialty area comprise important criterion measures, including basic skills for secondary-level vocational students. Parnell (1971) asserts that vocational programs contribute positively to general academic goals:

> Relating formal, planned instruction to the life-career roles of students will help bring about a marriage between "academic" and "vocational" programs and will help students find a new significance in learning, thus motivating them as so-called academic courses never could do. (p. 102)

However, research suggests that a prime determinant of achievement is students' time spent "on task." From this, one might hypothesize that the lesser amount of time spent by vocational students in general academic subjects would have negative consequences in terms of basic skills. Moreover, the need in vocational education programs to serve populations who are handicapped in terms of their entry level basic skills makes it important to understand the effectiveness of the program in developing basic skills.

Other benefits of vocational education, such as enhanced self-esteem, may be incorporated into impact evaluations of proximate outcomes. Relevant measures are available from existing work in the social sciences. Constructing and using new or unusual measures is sometimes risky when findings and interpretations are reviewed. For example, Egginton (1978b) wrote:

> Despite the massive investment of funds in vocational education programs and despite the recognition that vocational education curricula should address the problem of students' negative values and attitudes, the vocational education student still holds himself in low esteem and tends to treat learning with disdain. (p. 534)

Further examination reveals that the measure of negative self-image/defensiveness was:

Do you usually feel like the world is against you?

1. Yes
2. No

This measure has little to recommend its use. It is remarkable that expansive interpretation was based on a small difference in the proportions responding "Yes" (23.0 versus 21.2 percent). Furthermore, no measure of preexisting differences in so-called self-image was utilized in this study (Egginton, 1978a).

## Follow-up Evaluations

Information on the experiences of program completers and leavers provides promising opportunities for impact evaluation. Performance of graduates after leaving the program generates criterion measures that indicate the enhancement of the lives of participants.

Follow-up studies on program completers and leavers have been conducted in most states. Often the procedures are limited in length and frequency of follow-ups, the population coverage, and the substantive inquiry. Low rates of response often preclude confident interpretation of findings (Ball and Anderson, 1975; Headrick, 1977; Lee and Sartin, 1973; Paul, 1975 and 1976; Sparks, 1977). Even so, vocational education compares favorably with many other types and systems of education in the extent to which postprogram experiences of graduates are examined at all.

At state or substate levels, follow-up studies of alumni and employers are conducted for several types of impact analyses. Regular follow-up surveys seek to determine the postprogram status of alumni in a number of dimensions. In one case, an Illinois follow-up for high school programs (Felstehausen et al., 1973) obtained information on:

1. Influences on occupational decisions
2. Posthigh school employment and school enrollment status
3. Alumni assessment of program
4. Employer assessment of alumni work preparation
5. Employer assessment of important qualities and skills of prospective employees
6. Extent of training-related employment

Data collected on these six factors did not indicate that the program was successful, although graduates were likely to rate their programs highly. The methodology used did not allow the researchers to draw conclusions about the apparent discrepancy in these findings. Analysis of data from the National Longitudinal Surveys (Grasso and Shea, forthcoming a and b) suggests the importance of a clear conception of the attitude being measured when students rate their programs highly:

> Evidence suggests that occupational students do not like high school as much as other students, but that both occupational and other students tend to like very much the vocational courses that they have taken.

The same care is required for use of psychological measures. Findings on self-esteem may differ from those concerning what might be called academic self-esteem.

Comparative data on the experiences of nonvocational students are also required to better understand the tracking, selection, and socialization processes that operate within the secondary system. In Minnesota, a limited survey has been field-tested for collection of information on all high school students (Copa et al., 1976; Irvin and Copa, 1974). The State of Florida practices follow-up evaluation for all secondary school leavers; however, the potential for utilizing this comparative data for impact evaluation in vocational education has evidently not been realized.

Comparative data are especially important for studies of earnings of graduates and of the economic efficiency of programs (Stromsdorfer, 1972). Many states have performed some type of cost-benefit study (Ghazalah, 1975; Kraft and Weisman, 1970; Paul, 1976; Sparks, 1977; Swanson, 1976). However, when comparative data on the postschool experiences of nonparticipants are unavailable and estimated values are used instead, the findings may be challenged.

Impact studies of special programs of various types in vocational education (Somers et al., 1971; Stromsdorfer and Fackler, 1973; Walsh et al., 1976a and b) and other programs (Development Associates, Inc., 1972; Perry et al., 1976; Sprengle and Tomey, 1974; Stromsdorfer and Fackler, 1973; Moayed-Dadkhah, 1975) offer exemplary study designs that take advantage of available information on background, preexisting differences, and outcomes among comparison groups of nonparticipants. Other interesting studies compare outcomes of alternative types of vocational programs; for example, several studies performed comparative analysis on vocational programs conducted by public and private institutions (Wilms, 1974; Wolman et al., 1972). One longitudinal study on manpower training (Cooley et al., 1975) was facilitated with data on earnings obtained from the Social Security Administration. Another longitudinal study on a sample of youth from one state was possible through the cooperation of the Social Security Administration and the State Tax Department which provided earnings data (Sewell and Hauser, 1975).

Recently impact evaluation in vocational education has become more sophisticated. A cost-benefit study on cooperative education dealt with impact from several distinct perspectives (Cohen et al., 1977). The costs and benefits to the participant, the institution, and the employers were conceptualized and analyzed separately. Moreover, the authors deal with a limitation of cost-benefit analysis by separate analysis of probable limitations to the potential expansion of cooperative education programs. A study of economic returns to secondary-level occupational education conceptualized and measured various components of economic effects (Fisher et al., 1976). Specifically, the programs were designed to have both general and specific training components which conferred earnings advantages directly, as well as indirectly through enhanced probability of completion of high school, longer work experience (that is, less time spent not working), and complementing whatever postschool training may be received.

In vocational follow-up studies conducted by states, the timing of the follow-up presents a problem because, as several authors (Conroy and Diamond, 1976; Kaufman et al., 1969) suggest, initial earnings advantages disappear in a few years. The advantage may even be reversed over a longer period. Although alumni follow-ups conducted after a short period of time are advantageous in terms of relatively high rates of survey responses, the appropriate time reference in impact evaluation is the long-term assessment of the program impact over the working career. Unfortunately long-term follow-up data refers to graduates who completed their programs years ago, and findings reflect the effects of programs that operated at that time. These factors suggest the advisability of both short- and long-term follow-ups.

Data from national longitudinal studies have been analyzed on topics such as wage advantages and wage progression over time. Studies have used the National Longitudinal Surveys of Work Experience (Grasso, 1975; Grasso and Shea, forthcoming a and b) to examine the impact of vocational education and training. The data source refers to young men and women who attended high school during the 1960s; the follow-up data refer to the early 1970s. A range of labor market criteria were examined, including unemployment experiences, occupational assignment, hourly wage, annual earnings, and expressed satisfaction with jobs.

Other studies have used data from the National Longitudinal Study of the Class of 1972 (Creech, 1974; Creech et al., 1977; Echternacht, 1975; Freeberg and Rock, 1975; Nolfi et al., 1977) to investigate the effects of curriculum on measures ranging from self-esteem to wages and occupations. The availability within these national data files of information on background, personal characteristics, education, and postschool labor market experience facilitates the application of comprehensive analytic designs. Studies using these files may suggest improvements in the design of impact evaluations.

Grasso and Shea also investigated the question of occupational assignment by comparing the occupations held by secondary-level vocational graduates and those held by their nonvocational peers; that is, those who did not go to college. The availability of information on occupation and industry in which each was employed permitted the use of a variety of measures of "skill requirements" of the jobs held. Overall, the results contained no clear evidence to suggest that vocational graduates obtained jobs requiring higher skill levels than did nonvocational graduates. This suggests the need to incorporate information on suitable comparison groups in impact evaluation, and the need to use measures other than traditional measures, such as training-related placement. (For an illustration of such an attempt within vocational education, see Copa and Kleven, 1977.)

Findings based on both of these national data sets do not provide strong support for the proposition that vocational education represents a labor market advantage for males. For females, the vocational program is associated with higher pay than are the other curricula. For both males and females, participation in postsecondary education and training appears to confer labor market advantages. However, even here, several considerations sharply restrict the usefulness of findings and their interpretations for decision making, including:

1. Lack of information on the nature of the "program," its duration and intensity, and its costs

2. The impossibility of identifying exceptionally effective and ineffective programs

There may also be substantial effects for participants that have not been measured. For example, positive benefits for participants may exist in the capacity to "do-it-yourself." Consumer and homemaking programs and automobile repair are examples of programs teaching skills that are potentially useful in this way. It may be possible to estimate the impact of these programs.

The focus on impact to this point has been directed to participants in vocational education, nonparticipants, and employers. A few studies have also attempted to measure impact on society. Bolino (1972) studied the impact of occupational, adult, and various nonformal education programs upon society. An earlier study on the contribution of regular formal education to economic growth during the 20th century indicated that education accounted for twelve percent of the gross national product between 1900 and 1929, and for twenty-three percent from 1929 to 1957. Bolino's results might be interpreted to suggest that, of the national economic growth occurring from 1900 to 1957, about five percent may have been due to occupational and adult education and other education and training outside of regular schooling.

The literature review for this paper uncovered no studies evaluating the "impact upon society" at the state or local levels. The only possible exception (Tuttle and Alexander, 1976) considered the role of vocational education in local economic development in terms of attracting new industry and serving expanding industry.

The analysis, based on experience in one state, is interesting although the relationship to impact is unclear. In its discussion of the concept of "attracting new industry," it fails to consider whether the geographic movement of firms provides new opportunities in the receiving area while simultaneously reducing the opportunities in the sending area. Further analysis is needed in order to assess the impact of such cases on society. In the discussion of service to expanding industries, the analysis does not consider the underlying process governing the expansion of service. For example, it is not clear why expanded service for expanding firms should be given higher priority than improved or expanded service for stable firms.

The issue of the impact of vocational education on unemployment constitutes a similar case. Proponents may claim that the programs will combat high unemployment rates, but since vocational education does not create jobs, it does not expand the employment base. Moreover, studies may show that during the period following high school graduation, vocational graduates locate their first jobs faster than other graduates, but whether this phenomenon is due to occupational skills, placement assistance, or other influences is not clear. Data from the National Longitudinal Surveys (NLS) over several years do not indicate any advantage in terms of employment for male vocational graduates. The overwhelming

influence on NLS unemployment data is the state of the economy (Grasso and Shea, forthcoming a and b). Impact studies would need to reveal beneficial effects on unemployment rates and to demonstrate how these occur, in order to improve decision making on expanding vocational job-finding assistance programs.

Critics of vocational education assume that, in the absence of public support and provision of vocational education, employers and private institutions would provide any required training. Since much of vocational education is directed at developing rather general skills that would be useful to a large number of potential employers, it is not clear how responsive firms would be to undertaking this training function. Private training schools may be willing to expand but extensive student aid programs would be required to offset the unequal access that students may have to funds. Moreover, the history of strong local support for vocational education suggests that a shift from public to private provision would need to occur gradually. Students and society may place more importance on the goals of vocational education rather than developing specific marketable skills. Therefore, public vocational education may be rational and more efficient than the alternatives for providing socially optimal levels of training.

Interestingly, this logic does not involve discussion of wage or occupational advantages among vocational graduates. Instead, it suggests a socially optimal level of occupational training with the benefits captured partly by students, partly by employers, and certainly by society-at-large. Impact evaluation of vocational education in these terms has not yet been undertaken.

## CURRENT DEVELOPMENTS

### Evaluation Models for States

In addition to requiring extensive evaluation, the Education Amendments of 1976 provide for a number of evaluation efforts that may prove to be helpful to states in conducting evaluation.

Section 112(a)(2) requires that the Bureau of Occupational and Adult Education review and analyze the strengths and weaknesses of the programs assisted under the act in at least ten states each fiscal year beginning October 1, 1977, and ending September 30, 1982. Consistent with these responsibilities and to assist the states to fulfill their responsibilities under Section 112 (b)(1), the Bureau awarded a contract to CRC Education and Human Development, Inc., and its subcontractor Mary Ellis Associates, Inc., to assist the states by developing and providing the rough framework of a model evaluation subsystem. The subsystem was to consist of three components: process evaluation, product/outcome evaluation, and product/impact evaluation.

According to the plan, the process component was to be developed with the benefit of existing process models (Ash, 1973; Starr and Dieffenderfer, 1972) and would contain the following categories:

1. What is being done in vocational education?
   (a) Program
   (b) Curriculum
   (c) Ancillary services

2. Why is this being done?
   (a) Objectives
   (b) Student needs
   (c) Employer needs

3. Who participates in delivering vocational education?
   (a) Administration
   (b) Instructional and support staff
   (c) Employer participation

4. Who is receiving benefits of vocational education?
   (a) Regular students
   (b) Special populations

5. How and under what conditions is vocational education being delivered?
   (a) Administration and financial management
   (b) Facilities and equipment
   (c) Resources
   (d) Economic conditions

The product/outcome component would include career development and labor market outcomes for completers and leavers with recommended follow-up procedures, including questionnaires for alumni and employers. For example, the draft version of a questionnaire for former students included sections on educational history and current status, employment history and current status, post-completion or additional training, and job satisfaction and advancement.

The product/impact component would include "impact" conceived as student competencies and measured by criterion-referenced tests and standard occupational proficiency tests. This component was to rely on existing instruments; no new instruments were to be developed.

Unfortunately, in October 1978, the contract was cancelled before a final review and field-testing of the draft versions of the process and outcome components, and before the development of the impact component. State and local staffs may find it useful to review the draft version of the outcome component, especially since it was developed by means of extensive review of current practices in follow-up evaluation.

## Vocational Education Study

Section 523 (b)(1) provides that the National Institute of Education shall:

Undertake a thorough evaluation and study of vocational education programs, including such programs conducted by the states, and such programs conducted under the Vocational Education Act of 1963, and other related programs conducted under the Comprehensive Employment and Training Act of 1973 and by the State Post-Secondary Commissions authorized by the Education Amendments of 1972. Such a study shall include--

(A) A study of the distribution of vocational education funds in terms of services, occupations, target populations, enrollments, and educational and governmental levels and what such distribution should be in order to meet the greatest human resource needs for the next 10 years;
(B) An examination of how to achieve compliance with, and enforcement of, the provisions of applicable laws of the United States;
(C) An analysis of the means of assessing program quality and effectiveness;
(D) A review and evaluation of the effectiveness of (Consumer and Homemaking Programs).

In early 1977, NIE commissioned a series of preplanning papers to assist in formulating a study plan (Grasso and Shea, forthcoming b). A plan for the study and evaluation was sent to the Congress on December 30, 1977 by Henry David, Study Director, and included studies on the following topics:

A. Distribution of funds
   1. Quantitative Descriptive Study of the Distribution of Funds (Note: Awarded to University of California; Charles Benson, Principal Investigator)
   2. Case Studies on Meeting Special Needs
   3. Projecting Human Resource Needs and Funding Levels and Distributions
   4. Simulation Model
   5. Evaluations of Outcomes

B. Compliance
   1. Inventory of State Legal, Administrative, and Fiscal Practices for Vocational Education; Case Studies in Fifteen States; and Analysis of Federal Legislative Framework (Awarded to Abt Associates, Inc.)
   2. Study of Federal Capabilities for Implementation
   3. Study of Compliance and Enforcement in Selected Federal Grant-in-Aid Programs
   4. Vocational Education-CETA Coordination

C. Means of Assessing Program Quality and Effectiveness
   1. Review and Synthesis of Existing Information (Awarded to CRC Education and Human Development, Inc.)
   2. Conference on Evaluation (Conference on Effects of Vocational Education, June 1978)
   3. Case Studies in 10 States
   4. State Survey of Evaluation Practices

D. Consumer and Homemaking Education
   1. The Responsiveness of the C and HE System to Congressional Intent: Federal, State and Local (Awarded to CRC Education and Human Development, Inc.)
   2. The Effectiveness of C and HE
   3. Projecting What People Need to Know in 1982 and Beyond to be Intelligent Consumers and Effective Homemakers
   4. How People Now Acquire Consumer and Homemaking Information, Skills, and Abilities from Sources Other Than C and HE Programs

Several of these items relate to impact evaluation. First is a review of research based on various national data bases that involve vocational education issues (Grasso and Shea, forthcoming b). Second is a review of state practices concerning short-term follow-up studies (item C-1 above). A third review of any other recent evaluation research that relates to economic, social, and educational outcomes is yet to begin (item A-5 above). Finally it is item A-3 which may answer the question of what the distribution of vocational education "should be in order to meet the greatest human resource needs."

## National Center for Research in Vocational Education

Section 171 (a)(2) authorizes support for a National Center for Research in Vocational Education (NCRVE), whose responsibilities are to:

> (A) Conduct applied research and development on problems of national significance in vocational education;
> (D) Develop and provide information to facilitate national planning and policy development in vocational education;
> (F) Work with states, local education agencies, and other public agencies in developing methods of evaluating programs, including the follow-up studies of program completers and leavers required by Section 112, so that these agencies can offer job training programs which are more closely related to the types of jobs available in their communities, regions, and States.

The Center for Vocational Education, The Ohio State University, was designated to serve as the national center. Three projects there have significance for impact evaluation. The first is "Examining Vocational Education Outcomes and Their Correlates" directed by Robert L. Darcy (1979). Products will include a comprehensive listing of vocational education outcomes, an annotated bibliography of outcome studies, and a state-of-the-art essay.

The second, "Interpreting Outcome Measures in Vocational Education," was directed by Floyd McKinney (1978) and sponsored by the National Institute of Education. In August 1978 a conference in Louisville, Kentucky was held to explore issues and pitfalls in the interpretation of existing impact measures. Among the presented papers is a state-of-the-art review of job satisfaction and performance measures (Billings, 1978). A product of the project is a handbook

entitled Vocational Education Measures: Instruments to Survey Former Students and Their Employers.

The third is a study of vocational education research and development (R and D) product distribution, utilization, and impact directed by William Hull. This multi-year study promises to provide data on student and teacher attitudes toward the use of R and D products.

### Other Initiatives

1. The Office of Education is sponsoring a one-year survey of students in post-secondary schools with occupational programs to analyze their characteristics, reasons for selecting the school and programs, and future education and work plans (ref. RFP 78-59).

2. The National Center for Education Statistics, in addition to its work on VEDS, is sponsoring further analyses of data from the National Longitudinal Study of the Class of 1972, through the late 1976 follow-up, including studies of the effects of vocational secondary and postsecondary programs (ref. RFP 78-76).

3. The National Longitudinal Surveys, sponsored by the U.S. Department of Labor and directed by Michael E. Borus and Herbert S. Parnes at the Center for Human Resource Research, The Ohio State University, has been expanded to include a new sample of youth. The new questionnaires that are being developed will include improved items on vocational education and training, which will permit new research on impact.

## PROGNOSIS

What conclusions and implications for impact evaluation in vocational education can be drawn for the future? Vocational educators should recognize the need to review their own agency's progress in producing the acceptable and convincing evidence about vocational education that this paper has described.

The local reviews in each agency will reveal that some of their ongoing and forthcoming work is already consistent with the needs of impact evaluation. State and local personnel are in a strategic position to identify impact through their own studies and research. The literature search for this paper produced a number of ongoing efforts that promise to improve impact evaluation practices and procedures. For instance, the Washington State Advisory Council (1975) identified useful measures of success based on surveys of employers, students, graduates, and local advisory committee members. Other promising efforts for improving impact evaluation practices have also been reported (Franken and Earnhart, 1976; Hamlin and Muth, 1977; Illinois State Board of Vocational Education and Rehabilitation, 1974; New Educational Directions, Inc., 1975; and Riverside Research Institute, 1971 through 1974).

Designing and performing impact evaluation will lead to better understanding of the purposes of vocational education programs. Cooley and Lohnes (1976) suggest that the primary value of education programs rests not only on immediate outcomes, but also on the potential for transfer value over the long run. Attempting to evaluate impact in such terms requires study that may clarify the role of the program in the first place.

Taking advantage of the need and opportunity for impact evaluation is far easier to discuss than to perform. Because of limited resources, vocational educators must conceptualize their practice of impact evaluation over the short- and long-term, and utilize opportunities for cooperation. Cooperation between state and federal agencies engaged in impact evaluation is necessary, and may be achieved through mechanisms such as the National Coordinating Committee on Research in Vocational Education. Cooperation should be encouraged in identifying sources of supplementary funds to support the design and performance of promising impact evaluation proposals, especially those developed at state or local levels. Federal agencies should recognize the value of such cooperative proposals.

An analogous need for cooperation between agencies and advisory councils exists within the states. State or local agencies should require that researchers conducting evaluation studies within the state clarify the potential of the study for impact evaluation. In allocating available funds for impact evaluation, consideration needs to be given to the development of long-term impact evaluation capabilities. Research coordinating units, university researchers, and others should recognize the state level need to develop such capabilities over the long run.

As impact evaluation is conducted, information relating to its completion should be disseminated as widely as possible. The implementation of systematic procedures would also produce benefits. Copies of impact evaluation materials and reports that explain procedures and discuss findings and implications for the future should be sent to the National Advisory Council and should be contributed to ERIC for retrieval by interested persons in all states. Moreover, the Bureau of Occupational and Adult Education, the National Advisory Council, and the National Center for Research in Vocational Education should consider undertaking an ongoing, systematic review of the state-of-the-art in impact evaluation. At present it is possible that impact evaluation conducted or sponsored by agencies in vocational education are never revealed either to the National Advisory Council or the Bureau of Occupational and Adult Education. As a consequence, the potential for serving accountability needs has been lost. Moreover, the potential for one state to benefit from knowledge about the feasibility, methodology, and usefulness of impact evaluations completed in other states is never achieved.

Action on the part of relevant agencies and groups to implement these proposals would advance the state-of-the-art and achieve more effective and useful impact evaluation. In turn, this would permit realization of the potential of impact evaluation in achieving the best possible vocational education for all students.

## REFERENCES


Ahmann, J. S. "Assessing Job Knowledge and Generally Useful Skills of Young Americans." Journal of Vocational Education Research 2 (1977): 1-16.

Alexander, K. L., and McDill, E. Selection and Allocation Within Schools: Some Causes and Consequences of Curriculum Placement (Report #213). Baltimore, MD: Johns Hopkins University, May 1976.

Allen, D. A Three-year Follow-up Study. Los Angeles, CA: Division of Vocational Education, University of California, 1975.

American Vocational Association. Vocational Education Works! Rationale and Recommendations for Congressional Action. Washington, DC: 1978.

Anderson, R. B.; St. Pierre, R. G.; Proper, E. C.; and Stebbins, L. B. "Pardon Us, But What Was the Question Again?: A Response to the Critique of the Follow-Through Evaluation." Harvard Educational Review 48 (1978): 161-170.

Ash, L. C. Instruments and Procedures for the Evaluation of Vocational/Technical Education: National Study for Accreditation of Vocational/Technical Education. Washington, DC: American Vocational Association, 1973.

Aubrey, R. F. Career Development Needs of Thirteen-Year-Olds: How to Improve Career Development Programs. Washington, DC: National Advisory Council for Career Education, 1977.

Augsburger, J. V. "An Analysis of Academic Performance of Working and Non-working Students on Academic Probation at Northern Illinois University." Journal of Student Financial Aid 4 (1974): 30-38.

Bachman, J. G. Young Men in High School and Beyond: A Summary of Findings from the Youth in Transition Project (Final Report). Washington, DC: Bureau of Research, Office of Education, U.S. Department of Health, Education and Welfare, 1972.

Ball, S., and Anderson, S. B. Practices in Program Evaluation: A Survey and Some Case Studies. Princeton, NJ: Educational Testing Service, 1975.

Barnow, B. S. Theoretical Issues in the Estimation of Production Functions in Manpower Programs. Pittsburgh, PA: University of Pittsburgh, February 1976. (NTIS No. PB-256 247)

Barton, P. E. "Youth Employment and Career Entry." In Labor Market Information for Youths, edited by S. Wolfbein. Philadelphia, PA: Temple University, 1975.

Barton, P. E. "Juvenile Delinquency, Work and Education." Mimeographed. Washington, DC: National Manpower Institute, August 1976.

Berg, I. Education and Jobs: The Great Training Robbery. Boston, MA: Beacon Press, 1971.

Bhaerman, R. D. Career Education and Basic Academic Achievement: A Descriptive Analysis of the Research. Washington, DC: Office of Education, U.S. Department of Health, Education and Welfare, 1977.

Billings, R. S. "Job Satisfaction and Performance Measures: The State-of-the-Art." In McKinney, Floyd et al., Interpreting Outcome Measures in Vocational Education: A Final Report. Columbus, OH: National Center for Research in Vocational Education, The Ohio State University, September 1978.

Black, M. S. Student Attitudes Toward Vocational Education (Research and Development Series No. 114). Columbus, OH: Center for Vocational Education, The Ohio State University, March 1976.

Blooms, B. S. "Some Theoretical Issues Relating to Educational Evaluation." In Educational Evaluation: New Roles, New Means (Sixty-Eighth Yearbook of the National Society for the Study of Education, Part II), edited by R. W. Tyler. Chicago, IL: National Society for the Study of Education, 1969.

Bloom, B. S. Human Characteristics and School Learning. New York: McGraw-Hill, 1976.

Bolino, A. C. Occupational Education as a Source of Economic Growth. Washington, DC: Department of Economics, Catholic University of America, 1972. (NTIS No. PB-214 189)

Bowles, S., and Levin, H. M. "The Determinants of Scholastic Achievement--An Appraisal of Some Recent Evidence." Journal of Human Resources 3 (1968): 3-24. (b)

Bowles, S., and Levin, H. M. "More on Multicollinearity and the Effectiveness of School." Journal of Human Resources 3 (1968): 393-400. (a)

Branch, R. L. Evaluation System Model for the Basic Functions of Vocational Education in California: A Computer Based Evaluation System for Vocational Education. Sacramento, CA: County Department of Education, 1972.

Brandon, G. L. An Appraisal of the Manpower Training Programs Established by Congress in the 1960's (Project Baseline Supplemental Report). Flagstaff, AZ: Northern Arizona University, 1974.

Breglio, V. J.; Stevens, M.; and Tobias, J. Assessment of School Supervised Work Education Programs Part II: Urban Cooperative Work Education Programs and Follow-up Study (Final Report), Vol. 2: Work Education Program Outcomes-A Twenty Four-Month Follow-up Study. San Francisco, CA: Olympus Research Centers, 1976. (NTIS No. SHR-000 1430)

Bryant, T.; Counaham, J.; Langleis, J. T.; Totten, J.; Turner, I. S.; and Walsh, J. Assessment of School Supervised Work Education Programs Part II: Urban Cooperative Work Education Programs and Follow-up Study (Final Report), Vol. 3: Thirty Case Studies of Urban Cooperative Education Programs. San Francisco, CA: Olympus Research Centers, 1976. (NTIS No. SHR-000 1431)

Burdette, C. E. Design and Development of Fiscal and Student Follow-up Components of the West Virginia Comprehensive Data System for Vocational Education (Final Report). Charleston, WV: Bureau of Vocational, Technical and Adult Education, West Virginia Department of Education, 1976.

Cain, G., and Watts, H. "The Controversy About the Coleman Report: A Comment." Journal of Human Resources 3 (1968): 389-393.

Cain, G., and Watts, H. "Problems in Making Policy Inferences from the Coleman Report." American Sociological Review 35 (1970): 228-242.

Campbell, Donald T., and Stanley, Julian C. Experimental and Quasi-experimental Designs for Research. Chicago, IL: Rand-McNally College Publishing Company, 1963.

Center for Priority Analysis, National Planning Association. An Analysis of Manpower Requirements Information and the Availability of Vocational Education in Selected Urban and Rural Areas. Washington, DC: 1971. (NTIS No. PB-205 483)

Champagne, J. E., and Prater, R. L. Teenage Employment: A Study of Low Income Youth in Houston, Texas. Houston, TX: Center for Human Resources, University of Houston, July 1969.

Cicirelli, V. G.; Cooper, W. H.; and Granger, R. L. The Impact of Head Start. Athens, OH: Westinghouse Learning Corporation and Ohio University, 1969.

Cohen, A. J.; Deane, R. T.; and Frankel, S. Cooperative Education--A National Assessment (Abridged Final Report). Silver Spring, MD: Applied Management Sciences, 1977.

Cohen, A. M., and Solomon, L. C. Cooperative Education--A National Assessment: An Annotated Bibliography. Silver Spring, MD: Applied Management Sciences, 1976.

Coleman, J. S. "Equality of Educational Opportunity: Reply to Bowles and Levin." Journal of Human Resources 3 (1968): 237-246.

Coleman, J. S. "Reply to Cain and Watts." American Sociological Review 35 (1970): 242-249.

Coleman, J. S.; Campbell, E. O.; Hobson, C. J.; McPartland, J.; Mood, A. M.; Weinfeld, F. D.; and York, R. L. Equality of Educational Opportunity. Washington, DC: U.S. Government Printing Office, 1966.

Coleman, J. S., and Karweit, N. L. Information Systems and Performance Measures in Schools. Englewood Cliffs, NJ: Educational Technology Publication, 1972.

Collins, D. R. An Assessment of Benefits Derived from Membership in a Vocational Student Organization in the Vocational, Technical and Adult Education System (Final Report). Madison, WI: University of Wisconsin, 1977.

Committee on Education and Labor, House of Representatives. The Vocational Education and National Institute of Education Amendments of 1976: Report Together with Additional Views (94th Congress, 2nd Session, Report No. 94-1085). Washington, DC: U.S. Government Printing Office, 1976.

Comptroller General of the United States. What Is the Role of Federal Assistance for Vocational Education? (Report to the Congress). Washington, DC: U.S. Government Accounting Office, 1974.

Conroy, W. G., Jr. MISOE Management Information System for Occupational Education Impact Battery. Winchester, MA: Management and Information System for Occupational Education, n.d.

Conroy, W. G., Jr., and Diamond, D. E. The Impact of Secondary School Occupational Education in Massachusetts. Lowell, MA: University of Lowell, 1976.

CONSAD Research Corporation. Cooperative Education Planning Study: Annotated Bibliography. Pittsburgh, PA: 1975.

Cook, D. W. Vicarious Behavior Induction: A Modeling Strategy for Rehabilitation Change (Arkansas Studies in Vocational Rehabilitation Series IV Monograph #1). Fayetteville, AR: Arkansas Rehabilitation Research and Training Center, 1975. (NTIS No. PB-254 958)

Cooley, T. R.; McGuire, T. W.; and Prescott, E. C. The Impact of Manpower Training on Earnings: An Econometric Analysis (Final Report MEL 76-01). Pittsburgh, PA: Carnegie-Mellon University, September 30, 1975. (NTIS No. PB-253 249)

Cooley, W. W., and Lohnes, P. R. Evaluation Research in Education: Theory, Principles, and Practice. New York: Irvington, 1976.

Copa, G.; Irvin, D. E.; and Maurice, C. Status of Former High School Students: Procedure for Local Assessment. Summary Report for a State-wide Sample Class of 1974. Minneapolis, MN: Minnesota Research Coordinating Unit for Vocational Education, 1976.

Copa, G., and Kleven, B. A. Job Selection Patterns: Linkage Between Vocational Education Programs and the Labor Market. Minneapolis, MN: Minnesota Research Coordinating Unit for Vocational Education, February 1977.

Copa, G. H., and Maurice, C. F. People's Need for Additional Job Training: Development and Evaluation of an Assessment Procedure. Minneapolis, MN: Minnesota Research Coordinating Unit for Vocational Education, 1976.

CRC Education and Human Development, Inc. State-of-the-Art Review of Evaluation Procedures in Vocational Education (Draft Final Report). Belmont, MA: 1978.

Creech, F. R. A Vocational Re-evaluation of the Base Year Survey of the High School Class of 1972: Part I: Selected Characteristics of the Class of 1972. Princeton, NJ: Educational Testing Service, 1974.

Creech, F. R.; Freeburg, N. E.; Rock, D. A.; Wilson, K. M.; and Young, K. Comparative Analysis of Postsecondary Occupational and Educational Outcomes for the High School Class of 1972 (Final Report). Princeton, NJ: Educational Testing Service, 1977.

Cronbach, L. J., with Deken, J. E., and Webb, N. Research on Classrooms and Schools: Formulation of Questions, Design and Analysis. Stanford, CA: Stanford Evaluation Consortium, 1976.

Cross, K. P. The Integration of Learning and Earning: Cooperative Education and Nontraditional Study (ERIC/Higher Education Research Report No. 4). Washington, DC: American Association for Higher Education, 1973.

Darcy, Robert; Bolland, Kathy; Farley, Joanne; and Taylor, Caroline. Examining Vocational Education Outcomes and Their Correlates. Columbus, OH: National Center for Research in Vocational Education, The Ohio State University, January 1979.

Datta, L. "The Impact of the Westinghouse/Ohio Evaluation on the Development of Project Head Start: An Examination of the Immediate and Longer-term Effects and How They Came About." In The Evaluation of Social Programs, edited by C. C. Abt. Beverly Hills, CA: Sage, 1976.

Denton, W. T. Program Evaluation in Vocational and Technical Education. Columbus, OH: Center for Vocational and Technical Education, The Ohio State University, 1973.

Department of Health, Education and Welfare, Office of Education. Education for a Changing World of Work (Report of the panel of consultants on vocational education). Washington, DC: U.S. Government Printing Office, 1963.

Development Associates, Inc. An Evaluation of EDA Training Related Projects Finding-Analysis-Conclusion-Recommendation. Washington, DC: 1972. (NTIS No. COM-73-12017)

Development Associates, Inc. An Evaluation of Vocational Exemplary Projects: Part D Vocational Education Act Amendments of 1968 (Executive Summary Final Report). Washington, DC: 1975.

Drewes, D. W., and Katz, D. S. Manpower Data and Vocational Education: A National Study of Availability and Use. Raleigh, NC: Center for Occupational Education, North Carolina State University, 1975.

Drewes, D. W.; Nerden, J. T.; Lawrence, J. E. C.; and Oglesby, E. H. Questions in Vocational Education (Career and Vocational Education Professional Development Report No. 18). Raleigh, NC: North Carolina State University, 1975.

Drier, H. N. Programs of Career Guidance, Counseling, Placement, Follow-up and Follow-through: A Future Perspective. Columbus, OH: Center for Vocational Education, The Ohio State University, 1977.

Echternacht, G. J. A Vocational Re-evaluation of the Base Year Survey of the High School Class of 1972: Part II Characteristics Distinguishing Vocational Students from General and Academic Students. Princeton, NJ: Educational Testing Service, 1975.

Eckaus, R. S. Estimating the Returns to Education: A Disaggregated Approach. Berkeley, CA: The Carnegie Foundation for the Advancement of Teaching, 1973.

Egginton, E. "The Misguided Vocational Education Curriculum." College Student Journal Monograph 12 (1978): 2. (a)

Egginton, E. "Is Vocational Education Meeting Its Objectives?" Phi Delta Kappan 59 (1978): 533-534. (b)

Erickson, R. C., and Wentling, T. L. Measuring Student Growth: Techniques and Procedures for Occupational Education. Boston, MA: Allyn and Bacon, 1976.

Evans, R. N., and Galloway, J. D. "Verbal Ability and Socioeconomic Status of 8th and 12th Grade College Preparatory, General and Vocational Students." Journal of Human Resources 8 (1973): 24-36.

Evans, R. N.; Mangum, G. L.; and Pragan, O. Education for Employment: The Background and Potential of the 1968 Vocational Education Amendments. Ann Arbor, MI: Institute of Labor and Industrial Relations, University of Michigan, Wayne State University, and The National Manpower Policy Task Force, 1969.

Evans, R. N.; Holter, A.; and Stern, M. "Criteria for Determining Whether Competency Should be Taught On-the-Job or in a Formal Technical Course." Journal of Vocational Education Research I (1976): 21-38.

Farber, D. An Analysis of Change in Earnings of Participants in Manpower Training Programs (Unpublished Report). Washington, DC: U.S. Department of Labor, 1972.

Federal Register. October 3, 1977.

Feldstein, M. "The Economics of the New Unemployment." The Public Interest 33 (1973): 3-42.

Felstehausen, J. L.: Lenihan, G. O.; Kappitz, R. W.: and Garrity, R. L. Follow-up Report on Illinois "Class of '71" Occupational Program Alumni. Charleston, IL: Center for Educational Studies, Eastern Illinois University, 1973.

Fennessey, J. Blending Evidence, Technique, and Judgment in Educational Research Inference (Final Report). Baltimore, MD: Department of Social Relations, Johns Hopkins University, 1976.

Fetters, W. B. National Longitudinal Study of the High School Class of 1972: Student Questionnaire and Test Results by Sex, High School Program, Ethnic Category, and Fathers' Education. Washington, DC: U.S. Department of Health, Education and Welfare and National Center for Education Statistics, 1975.

Finn, M. F., and Hobbie, R. Using Labor Market Information for Planning Vocational Education in Ohio. Columbus, OH: Center for Vocational Education, The Ohio State University, 1975.

Fisher, D.; Klees, S.; Pachico, D.; and Tobin, D. The Economic Returns to BOCES Secondary School Occupational Education Investment. Ithaca, NY: Cornell Institute for Research and Development in Occupational Education, 1976.

Flanagan, J. C.; Davies, F. B.; Dailey, J. T.; Shaycoft, M.F.; Orr, D. B.; Goldbert, I.; and Neyman, C. A. Project Talent: The Identification, Development and Utilization of Human Talents. The American High School Student (Cooperative Research Project No. 635). Pittsburgh, PA: University of Pittsburgh, 1964.

Flanagan, J. C.; Dailey, J. T.; Shaycoft, M. F.; Orr, D. B.; and Goldbert, I. Project Talent: A Survey and Follow-up of Educational Plans and Decisions in Relation to Aptitude Patterns: Studies of the American High School. (Cooperative Research Project No. 226). Pittsburgh, PA: University of Pittsburgh, 1964.

Florida State Advisory Council on Vocational and Technical Education. Vocational-Technical Education in Human Resource Development in Florida: A Statewide Evaluation. Tallahassee, FL: Department of Educational Administration, Florida State University, 1970.

Franken, M. E., and Earnhart, J. An Assessment of Vocational Education in Wisconsin--1976. Binghamton, NY: State University of New York, 1976.

Freeberg, N. E., and Rock, D. A. A Vocational Re-evaluation of the Base Year Survey of the High School Class of 1972 Part III: Aspirations and Plans of High School Students: The Role of Academic, Social and Personal Characteristics. Princeton, NJ: Educational Testing Service, 1975.

Ganschow, L. H.; Helliwell, C. B.; Hamilton, J. A.; Jones, G. B.; and Tiedeman, D. V. Practical Career Guidance, Counseling, and Placement for the Non-College-Bound Student: A Review of the Literature. Palo Alto, CA: American Institutes for Research, 1973. (NTIS No. PB-246 578/9ST)

Geigle, E. K. Management Information Systems. Columbus, OH: National Center for Research in Vocational Education, The Ohio State University, 1978.

Ghazalah, I. A. Vocational Education Planning Districts in Ohio: An Economic Evaluation of Foregone Benefits from Limited Participation. Columbus, OH: Division of Vocational Education, Ohio State Department of Education, 1975.

Goldstein, J. H. The Effectiveness of Manpower Training Programs: A Review of Research on the Impact on the Poor. Joint Economic Committee, Congress of the United States. Washington, DC: U.S. Government Printing Office, 1972.

Gottfredson, L. S. Race and Sex Differences in Occupational Aspirations: Their Development and Consequences for Occupational Segregation (Report No. 254). Baltimore, MD: Center for Social Organization of Schools, Johns Hopkins University, 1978.

Grasso, J. T. "High School Curriculum from a Policy Point of View." Educational Forum 41 (1977): 465-476.

Grasso, J. T. "On the Declining Labor Market Value of Schooling." Paper presented at the 1977 Annual Meeting of the American Educational Research Association, New York: April 1977.

Grasso, J. T. The Contribution of Vocational Education, Training and Work Experience to the Early Career Achievements of Young Men. Columbus, OH: Center for Human Resource Research, The Ohio State University, 1975.

Grasso, J. T., and Shea, J. R. Vocational Education and Training: Impact on Youth. Technical Report. Berkeley, CA: Carnegie Council on Policy Studies in Higher Education, forthcoming (a).

Grasso, J. T., and Shea, J. R. "Effects of Vocational Education Programs: Research Findings and Issues." In Planning Papers for the Vocational Education Study (Vocational Education Study Publications, Occasional Papers, Vol. 1). Washington, DC: National Institute of Education, forthcoming (b).

Hall, R. E. "Prospects for Shifting the Phillips Curve Through Manpower Policy." Brookings Papers on Economic Activity 3 (1971): 659-701.

Hamburger, M., and Wolfson, H. T. One Thousand Employers Look at Occupational Education (Occupational Curriculum Project Report No. 1). New York: Board of Education of the City of New York, 1969.

Hamlin, R. E., and Muth, C. R. Planning for Vocational Education: A Selected Bibliography. East Lansing, MI: Michigan State University, 1977.

Harvard Educational Review. "Equal Educational Opportunity." (Expansion of the Winter 1968 Special Issue.) Cambridge, MA: (1969): 38.

Harvard Educational Review. "Perspectives on Inequality." (Reprint Series No. 8) Cambridge, MA: 1973.

Hauser, R. M.; Sewell, W.; and Alwin, D. "High School Effects on Achievement." In Schooling and Achievement in American Society, edited by Sewell, Hauser and Featherman. New York: Academic Press, 1976.

Headrick, M. L. Making Effective Use of Educational Follow-up Information. Pensacola, FL: The University of West Florida, 1977.

Herr, E. L.; Enderlein, T. E.; and Martin, R. B. An Examination of the Relationships Between the High School Experiences of Youth and Success and Satisfaction in Post-secondary Endeavors (Final Report). University Park, PA: The Pennsylvania State University, 1975.

Herriott, R. E., and Muse, D. N. "Methodological Issues in the Study of School Effects." In Review of Research in Education, edited by F. N. Kerlinger. Itasca, IL: F. E. Peacock, 1973.

Hill, R. C. Dropping Out of High School: The Effects of Family, Ability, School Quality and Local Employment Conditions. Washington, DC: Brookings Institution, 1975.

Hilton, T. L. A Study of Intellectual Growth and Vocational Development (Final Report). Princeton, NJ: Educational Testing Service, 1971.

Hodges, W. L. "The Worth of the Follow-Through Experience." Harvard Educational Review 48 (1978): 186-192.

House, E. R.; Glass, G. V.; McLean, L. D.; and Walker, D. F. "No Simple Answer: A Critique of the Follow-Through Evaluation." Harvard Educational Review 48 (1978): 128-160.

Hugueley, J. E. SPAN: An Accelerated Project for a System Program Approaching Non-unemployment of Vocational Students (Final Report). Memphis, TN: Memphis City School System, 1973.

Illinois State Board of Vocational Education and Rehabilitation. Three Phase Systems for Statewide Evaluation of Occupational Education Programs. Springfield, IL: Division of Vocational and Technical Education, 1974.

Impellitteri, J. T., and Kapes, J. T. A Longitudinal Study of Vocational Development: Implications for Vocational Education and Guidance (Vocational Development Series Monograph No. 1). University Park, PA: Department of Vocational Education, The Pennsylvania State University, 1971.

Irvin, D., and Copa, G. Status of Former High School Students: Procedures for Local Assessment (Report of the Final Test). Minneapolis, MN: Minnesota Research Coordinating Unit for Vocational Education, 1974.

Jencks, C.; Bartlett, S.; Corcoran, M.; Crouse, J.; Eaglesfield, D.; Jackson, G.; McClelland, K.; Mueser, P.; Olneck, M.; Schwartz, J.; Ward, S.; and William, J. The Effects of Family Background, Test Scores, Personality Traits, and Schooling on Economic Success (Vol. 1 and 2). Cambridge, MA: Center for the Study of Public Policy, 1977. (NTIS No. PB-270 022)

Jencks, C., and Brown, M. D. "Effects of High Schools on Their Students." Harvard Educational Review 45 (1975): 273-324.

Jencks, C.; Smith, M.; Acland, H.; Bane, M. J.; Cohen D.; Gintis, H.; Heyns, B.; and Michelson, S. Inequality: A Reassessment of the Effect of Family and Schooling in America. New York: Basic Books, 1972.

Johnson, D. W. "Affective Outcomes." In Evaluating Educational Performance, edited by H. J. Walberg. Berkeley, CA: McCutchan, 1974.

Jones, G. B.; Tiedeman, D. V.; Mitchell, A. M.; Unruh, W. R.; and Helliwell, C. B. Planning Structuring, and Evaluating Practical Career Guidance for Integration by Noncollege-bound Youths. Palo Alto, CA: American Institutes for Research, 1973. (NTIS No. PB-246 577/1ST)

Kapes, J. T.; Enderlin, T. E.; and Martin, R. B. A Longitudinal Study of Vocational Development and Program Evaluation: Implications for Curriculum Planning and Vocational Guidance (Final Report). University Park, PA: The Pennsylvania State University, 1974.

Kapes, J. T., and Lotowycz, L. W. Changes in the Occupational Values of Students between Ninth and Tenth Grade as Related to Course of Study and Other Student Characteristics. University Park, PA: The Pennsylvania State University, 1972.

Kaufman, J. J. Sex Discrimination in Vocational Education. Paper presented at the Annual Meeting of the American Vocational Association, Anaheim, CA: December 7, 1975.

Kaufman, J. J.; Hu, T. W.; Lee, M. L.; and Stromsdorfer, E. A Cost-Effectiveness Study of Vocational Education. University Park, PA: Institute for Research on Human Resources, The Pennsylvania State University, 1969.

Kelley, S. C.; Chirikos, T. N.; and Finn, M. Manpower Forecasting in the United States: An Evaluation of the State-of-the-Art. Columbus, OH: Center for Human Resource Research, The Ohio State University, 1975.

Kelley, S. C.; Sandver, M.; Windom, J.; Kell, M.; and Dubravcic, E. The Supply Specification of Vocational and Technical Training in Ohio. Columbus, OH: The Ohio State University, 1977.

Kievit, M. B. Perspectivism in Choosing and Interpreting Outcome Measures in Vocational Education. Paper presented at the National Conference on Outcome Measures for Vocational Education, Louisville, KY: August 1978.

Kraft, R. H. P., and Weisman, L. Vocational-Technical Education in Human Resource Development in Florida: A Statewide Evaluation. Tallahassee, FL: Florida State University, 1970.

Kruger, D. H. Occupational Preparation Programs: Implications for Vocational Education R & D (Occasional Paper No. 31). Columbus, OH: Center for Vocational Education, The Ohio State University, 1977.

Law, G. F. Impact of Vocational Education and Manpower Training on the Labor Market. Flagstaff, AZ: Northern Arizona University, 1974.

Lecht, L. A. Evaluating Vocational Education: Policies and Plans for the 1970's. New York: Praeger, 1974.

Lecht, L. A. Occupational Choices and Training Needs: Prospects for the 1980's. New York: Praeger, 1977.

Lecht, L. A.; Matland, M.; and Rosen, R. Changes in Occupational Characteristics: Planning Ahead for the 1980's. New York: The Conference Board, 1976.

Lee, A. M., and Sartin, R. Learning a Living Across the Nation (Project Baseline Second National Report 1970-1972). Flagstaff, AZ: Northern Arizona University, 1973.

Lucas, H. C., Jr. Why Information Systems Fail. New York: Columbia University Press, 1975.

Luecke, D. F., and McGinn, N. F. "Regression Analyses and Education Production Functions: Can They Be Trusted?" Harvard Educational Review 45 (1975): 325-350.

Lusterman, S. Education in Industry. New York: The Conference Board, 1977.

McKinney, F. Program Evaluation in Vocational Education: A Review. Columbus, OH: Center for Vocational Education, The Ohio State University, 1977.

McKinney, Floyd; Gray, Kenney; and Abram, Marie. Interpreting Outcome Measures in Vocational Education: A Final Report. Columbus, OH: National Center for Research in Vocational Education, The Ohio State University, September 1978.

McNamara, J. F., and Franchak, S. J. Planning Vocational Education Programs in Pennsylvania: Guidelines for the Use of Labor Market Information. Harrisburg, PA: Pennsylvania Research Coordinating Unit for Vocational Education, 1970.

Macro Systems, Inc. Evaluation of the Occupational Training Information System (OTIS). Silver Spring, MD: 1974. (NTIS No. COM-74-11073)

Magisos, J. H., and Jezierski, K. A. Youth Unemployment: An Annotated Bibliography of Articles and Reports (Bibliography Series No. 46). Columbus, OH: Center for Vocational Education, The Ohio State University, March 1977.

Magisos, J. H., and Moore, A. B. Evaluation of Vocational Education R & D Programs: An Integrative Analysis of Recent Studies. Columbus, OH: Center for Vocational Education, The Ohio State University, 1977.

Magisos, J. H., and Stakelon, A. E. Post-secondary Vocational Education: An Annotated Bibliography of Publications and Projects (Bibliography Series No. 31). Columbus, OH: Center for Vocational Education, The Ohio State University, October 1975.

Mangum, G. L. Employability, Employment, and Income: A Reassessment of Manpower Policy. Salt Lake City, UT: Olympus Publishing Company, 1976.

Martin, R. B. Relationships Between Holland's Vocational Preference Inventory and Vocational-Technical Student Achievement. University Park, PA: The Pennsylvania State University, 1972.

Meigs, J. Federal Manpower Programs: The Need for Experimental Design. Washington, DC: Assistant Secretary for Planning, Evaluation, and Research, U. S. Department of Labor, 1975. (NTIS No. PB 266 047)

Mendenhall, E. B. The Nebraska Vocational Information System (Final Report). Lincoln, NE: Nebraska Occupational Needs Research Coordinating Unit, 1977.

Miller, J. V. Career Development Needs of Nine-Year-Olds: How to Improve Career Development Programs. Washington, DC: National Advisory Council for Career Education, 1977.

Miller, R., and Miller, L. W. Impact of Vocational Education Research at the Federal and State Levels (Project Baseline Supplemental Report). Flagstaff, AZ: Northern Arizona University, 1974.

Mitchell, A. M. Career Development Needs of Seventeen-Year-Olds: How to Improve Career Development Programs. Washington, DC: National Advisory Council for Career Education, 1977.

Moayed-Dadkhah, K. Cost Analysis of OEO-ORI Longitudinal Study of Four Manpower Programs. Bloomington, IN: Indiana University, 1975. (NTIS No. PB-267 769)

Moore, A. B., and Jezierski, K. A. Evaluation of Vocational Education Programs: An Annotated Bibliography of Articles and Reports (Bibliography Series No. 44). Columbus, OH: Center for Vocational Education, The Ohio State University, March 1977.

Moser, C. H. An Evaluation of Area Skill Surveys as a Basis for Manpower Policies. Madison, WI: University of Wisconsin, 1971.

Mosteller, F., and Moynihan, D., eds. On Equality of Educational Opportunity. New York: Random House, 1972.

Mullis, I. V. S.; Oldefendt, S. J.; and Phillips, D. L. What Students Know and Can Do: Profiles of Three Age Groups. Denver, CO: Education Commission of the States, 1977.

National Advisory Council on Vocational Education. Overview: 1974 Reports. Washington, DC: 1974.

National Advisory Council on Vocational Education. Overview: 1975 Reports. Washington, DC: 1975.

National Advisory Council on Vocational Education. Overview: 1976 Reports of the State Advisory Councils on Vocational Education. Washington, DC: 1976.

National Analysts, Inc. A Follow-Up Study of Closed Vocational Rehabilitation Cases. Philadelphia, PA: 1974. (NTIS No. PB 243 001)

National Planning Association, Center for Priority Analysis. Policy Issues and Analytical Problems in Evaluating Vocational Education (Final Report, Part I and II). Washington, DC: Office of Program Planning and Evaluation, Office of Education, U. S. Department of Health, Education, and Welfare, 1972.

New Educational Directions, Inc. Evaluation of Vocational Technical Education Phase I: A Review of the Literature. Crawfordsville, IN: 1975.

New Educational Directions, Inc. Evaluation of Vocational Technical Education Phase II: A Skeletal Model with Suggested Research and Development Activities. Crawfordsville, IN: 1976.

Noeth, R. J., and Hanson, G. R. A Five-year Follow-up of Students Enrolled in Post-secondary Vocational-Technical-Transfer Programs. Iowa City: American College Testing Program, 1975.

Noeth, R. J.; Roth, J. D.; and Prediger, D. J. "Student Career Development: Where Do We Stand?" The Vocational Guidance Quarterly 3 (1975): 210-218.

Nolfi, G. J.; Fuller, W. C.; Corazzini, A. J.; Epstein, W. H.; Freeman, R. B.; Manski, C. F.; Nelson, V. I.; and Wise, D. A. Experiences of Recent High School Graduates: The Transition to Work or Postsecondary Education. Cambridge, MA: University Consultants, 1977.

O'Reilly, P. A. Predicting the Stability of Expressed Occupational Choices of Secondary Students (Vocational Development Study Monograph No. 13). University Park, PA: Department of Vocational Education, The Pennsylvania State University, 1973.

Parnell, D. "Career-oriented Education: Mandates for Change in Secondary Schools." In Contemporary Concepts in Vocational Education (First Yearbook of the American Vocational Association), edited by G. F. Law. Washington, DC: American Vocational Association, 1971.

Parnes, H. S. Planning Education for Economic and Social Development. Paris: OECD, 1964.

Parnes, H. S. A Conceptual Framework for Human Resource Policy: Implications for Vocational Education Research and Development (Occasional Paper No. 14). Columbus, OH: Center for Vocational Education, The Ohio State University, n.d.

Patton, M. Q. Alternative Evaluation Research Paradigm. Grand Rapids, ND: Center for Teaching and Learning, University of North Dakota, 1975.

Paul K. K. A Manual for Conducting Follow-up Surveys of Former Vocational Students (Research and Development Series No. 106). Columbus, OH: Center for Vocational Education, The Ohio State University, 1975.

Paul, K. K. What Happens After Training: A Review of Follow-up of Vocational Graduates. Nashville, TN: Urban Observatory of Metropolitan Nashville and University Centers, 1976. (NTIS No. PB-259 429)

Pedhazur, E. J. "Analytic Methods in Studies of Educational Effects." Review of Research in Education 3, edited by F. N. Kerlinger. Itasca, IL: F. E. Peacock, 1975.

Perry, C. R.; Anderson, B. E.; Rowan, R. L.; and Northrup, H. R. The Impact of Government Manpower Programs: In General and on Minorities and Women (Manpower and Human Resources Studies No. 4). Philadelphia, PA: Industrial Relations Unit, The Wharton School, University of Pennsylvania, 1976.

Peterson, J. C.; Halasz, I. M. ; and Bina, J. V. Information Resources for Education. Columbus, OH: Center for Vocational Education, The Ohio State University, 1977.

Popham, W. J., ed. Evaluation in Education. Berkeley, CA: McCutchan, 1974.

Prediger, D. J.; Roth, J. D.; and Noeth, R. J. "Career Development of Youth: A Nationwide Study." Personnel and Guidance Journal 53 (1974): 97-104.

Prescott, E. C., and Colley, T. F. Evaluating the Impact of MDTA Programs on Earnings Under Varying Labor Market Conditions (Final Report MEL 73-09). Philadelphia, PA: University of Pennsylvania, 1972.

Reubens, B. G. Vocational Education for All in High School? Work and the Quality of Life: Resource Papers for Work in America, edited by J. O'Toole. Cambridge: Massachusetts Institute of Technology, 1974.

Riverside Research Institute. The Coordination of Program Planning and Evaluation Systems for Occupational Education Volume 3: Monitoring System for Occupational Education. New York: 1971.

Riverside Research Institute. The Coordination of Program Planning and Evaluation Systems for Occupational Education: The Development and Implementation of the Reporting and Evaluation System for Occupational Education. New York: 1974.

Riverside Research Institute. The Coordination of Program Planning and Evaluation Systems for Occupational Education Volume 1: A Reporting and Evaluation System for Occupational Education. New York: 1972.

Riverside Research Institute. The Coordination of Program Planning and Evaluation Systems for Occupational Education Volume 2: A Targeting System for Occupational Education. New York: 1972.

Rivlin, A. M. Systematic Thinking for Social Action. Washington, DC: The Brookings Institution, 1971.

Rivlin, A M., and Timpane, P. M., eds. Planned Variation in Education: Should We Give Up or Try Harder? Washington, DC: Brookings Institution, 1975.

Robin, G. D. An Assessment of the In-school Neighborhood Youth Corps Projects in Cincinnati and Detroit with Special Reference to Summer-Only and Year-Round Enrollees (Final Report). Philadelphia, PA: National Analyst, 1969.

Roby, P. A. "Toward Full Equality: More Job Education for Women." School Review 84 (1976): 118-211.

Rosenbaum, J. E. Making Inequality. New Haven, CT: Yale University, 1976.

Rossi, P. H., and Wright, S. R. "Evaluation Research: An Assessment of Theory Practice and Politics." Evaluation Quarterly 1 (1977): 5-52.

Sanders, G., and Dennis, W. A. The Impact of New Area Vocational Schools on the Appalachian Region. Washington, DC: U.S. Office of Education, 1971.

Scott, R. E.; Harris, J. L.; Daniels, R. B.; and Rawson, W. Kansas Manpower Utilization System for Training (K-MUST) (Final Report Volume 2: Supplemental Studies). Topeka, KS: Division of Vocational Education, Kansas State Department of Education, 1973.

Scriven, M. S. "The Methodology of Evaluation." In Perspectives of Curriculum Evaluation (AERA Monograph Series on Curriculum Evaluation No. 1), edited by R. W. Tyler, R. M. Gagne, and M. S. Scriven. Chicago, IL: Rand-McNally, 1967.

Sewell, W. H., and Hauser, R. M. Education, Occupation, and Earnings: Achievement in the Early Career. New York: Academic Press, 1975.

Shaycroft, M. F. The High School Years: Growth in Cognitive Skills (Interim Report No. 3). Pittsburgh, PA: American Institutes for Research and School of Education, University of Pittsburgh, 1967.

Shea, B., and Rehber, R. A. Identification of Selection Variables Associated with Years of Schooling Achieved. Paper presented at the New York State Sociological Association Convention, 1973.

Shea, J. R. Manpower Policies and Unemployment Among Women and Youth. Proceedings of the Twenty-fifth Annual Winter Meeting of the Industrial Relations Research Association, 1973.

Smith, M. "Equality of Educational Opportunity: Comments of Bowles and Levin." Journal of Human Resources 3 (1968): 384-389.

Somers, G. C.; Sharp, L. M.; and Myint, T. The Effectiveness of Vocational and Technical Programs: A National Follow-up Survey. Madison, WI: Center for Studies in Vocational and Technical Education, University of Wisconsin, 1971.

South Carolina State Advisory Council on Vocational and Technical Education. The Adequacy of Vocational and Technical Education: The Report of a Special Study. Columbia, SC: 1976.

Spady, W. G. "The Impact of School Resources on Students." In Review of Research in Education 1, edited by F. N. Kerlinger. Itasca, IL: F. E. Peacock, 1973.

Sparks, D. A Synthesis of Research Findings Which Describe Selected Benefits and Outcomes for Participants in Vocational Education. Washington, DC: Bureau of Occupational and Adult Education, Department of Health, Education, and Welfare, 1977.

Spiess, K. H., and Spiess, E. R. A Guide to Evaluation: Massachusetts Information Feedback System for Vocational Education (First Technical Progress Report). Boston, MA: Massachusetts Research Coordinating Unit for Vocational Education, 1968.

Sprengle, P. D., and Tomey, A. E. Longitudinal Impact Assessment of the 1971-1972 Vocational Exploration in the Private Sector Program. St. Louis, MO: Center for Urban Progress, 1974.

Stake, R. E. "The Countenance of Educational Evaluation." Teachers College Record 68 (1967): 523-540.

Stakelon, A. E., and Magisos, J. H. Evaluation of Work Experience, Cooperative Education, and Youth Manpower Programs: An Annotated Bibliography (Bibliography Series No. 28). Columbus, OH: Center for Vocational Education, The Ohio State University, October 1975.

Starr, H.; Black, M. S.; and Gray, K. E. Management Information Systems for Vocational Education: A National Study (Research and Development Series No. 126). Columbus, OH: Center for Vocational Education, The Ohio State University, 1977.

Starr, H., and Dieffenderfer, R. A. A System for Statewide Evaluation of Vocational Education. Columbus, OH: Center for Vocational and Technical Education, The Ohio State University, 1972.

Steele, M. Women in Vocational Education (Project Baseline Supplemental Report). Flagstaff, AZ: Northern Arizona University, October 1974.

Stevens, D. W. Employment Projections for Planning Vocational-Technical Education Curricula: Mission Impossible? Columbia, MO: University of Missouri, 1976.

Stevenson, W. W. The Educational Amendments of 1976 and Their Implications for Vocational Education. Columbus, OH: Center for Vocational Education, The Ohio State University, 1977.

Stevenson, W. W., and Ward, W. G. Conducting Evaluation Within a State: Information for State Leaders. Columbus, OH: Center for Vocational and Technical Education, The Ohio State University, 1973.

Stromsdorfer, E. W. Review and Synthesis of Cost-effectiveness Studies of Vocational and Technical Education. Columbus, OH: Center for Vocational and Technical Education, The Ohio State University, 1972.

Stromsdorfer, E. W., and Fackler, J. S. An Economic and Institutional Analysis of the Cooperative Vocational Education Program in Dayton, Ohio. Bloomington, IN: Indiana University, March 1973. (NTIS No. PB-224 993/6)

Stromsdorfer, E. W.; Fackler, J. S.; Felton, M. V.; and Kelcher, R. E. An Economic Analysis of the Work Experience and Career Exploration Program: 1971-1972 School Year (Final Report). Bloomington, IN: Indiana University, July 1973. (NTIS No. PB-223 366)

Stufflebeam, D. L. "Alternative Approaches to Educational Evaluation: A Self-Study Guide for Educators." In Evaluation in Education: Current Applications, edited by W. J. Popham. Berkeley, CA: McCutchan, 1974.

Stufflebeam, D. L.; Foley, W. J.; Gephart, W. J.; Guba, E. G.; Hammond, R. L.; Merriman, H. O.; and Provus, M. M. Educational Evaluation and Decision Making. Bloomington, IN: Phi Delta Kappa, 1971.

Swanson, A. D. A Study of the Costs, Benefits, and Effectiveness of Occupational Education. Buffalo, NY: State University of New York, 1976.

Talarzyk, W. Perceptions of Vocational Education in Ohio by Employers. Columbus, OH: Ohio State Advisory Council for Vocational Education, 1975.

Taylor, J. E.; Montague, E. K.; and Michaels, E. R. An Occupational Clustering System and Curriculum Implication for the Comprehensive Career Education Model. Alexandria, VA: Human Resources Research Organization, 1972. (NTIS No. PB-210 089)

Thomas, H. B. Data-based Locally Directed Evaluation of Vocational Education Programs. Component 2: Comparison of Program Output with Community Occupational Needs. Tallahassee, FL: Florida State University, 1977.

Thomas, H. B. Data-based Locally Directed Evaluation of Vocational Education Programs. Component 3: Assessing Student Career Interests. Tallahassee, FL: Florida State University, 1977.

Thurow, L. C. Generating Inequality: Mechanisms of Distribution in the U.S. Economy. New York: Basic Books, 1975.

Todd, E. S. "Some Economic Implications of Secondary School Curricula." Ph.D. dissertation, The University of Chicago, 1969.

Tuttle, F. T., and Alexander, A. B. The Impact of Vocational Technical Education on Manpower and Economic Development. Stillwater, OK: State Department of Vocational Technical Education, 1976.

U.S. Bureau of the Census. 1970 Census of Population Subject Reports: Education Attainment (Final Report PC(2)-5B). Washington, DC: U.S. Government Printing Office, 1973.

U.S. Bureau of Labor Statistics. Occupational Projections and Training Data (Bulletin 1918). Washington, DC: U.S. Government Printing Office, 1976.

Van Maanen, J., and Schein, E. H. Improving the Quality of Work Life: Career Development. Cambridge, MA: Massachusetts Institute of Technology, 1975. (NTIS No. PB-257 390/5ST)

Vincent, H. An Analysis of Vocational Education in Our Secondary Schools, rev. ed. Washington, DC: Office of Education, Office of Program Planning and Evaluation, U.S. Department of Health, Education and Welfare, July 1969.

Walsh, J., and Totten, J. L. Assessment of Vocational Education Programs for the Disadvantaged Under Part B and Part A Section 102 (b) of the 1968 Amendments to the Vocational Education Act. Salt Lake City, UT: Olympus Research Centers, 1976. (NTIS No. SHR-000 1921) (a)

Walsh, J. and Breglio, V. J. Assessment of School Supervised Work Education Programs Part 2: Urban Cooperative Work Education Programs and Follow-up Study (Final Report), Vol 1. Overview of Thirty Urban Cooperative Education Programs. San Francisco, CA: Olympus Research Centers, 1976. (NTIS No. SHR-000 1429) (b)

Walther, R. H. Analysis and Synthesis of DOL Experience in Youth Transition to Work Programs. Alexandria, VA: Manpower Research Projects, 1976. (NTIS No. PB-272 435/9ST)

Wang, M.; Novick, M. R.; Isaacs, G. L.; and Ozeene, D. "A Bayesian Data Analysis System for the Evaluation of Social Programs." Journal of the American Statistical Association 72 (1977): 711-722.

Washington State Advisory Council on Vocational Education. Vocational Education in Washington State: A Critical Evaluation. Part One: Summary Findings and Recommendations. Olympia, WA: 1972.

Washington State Advisory Council on Vocational Education. Vocational Education in Washington State: A Critical Evaluation. Part Two: Detailed Analysis. Olympia, WA: 1972.

Washington State Advisory Council on Vocational Education. Vocational Education Success Measures and Related Concerns. Olympia, WA: 1975.

Weinberger, E.; Downey, G. T.; and Conroy, W. G. Delineation of MISOE's Static Space. Winchester, MA: Management and Information System for Occupational Education, 1972.

Wentling, T. L., and Lawson, T. E. Evaluating Occupational Education and Training Programs. Boston, MA: Allyn and Bacon, 1975.

Whyte, W. F. "The Behavioral Sciences and Manpower Research." In Human Resources and Economic Welfare, edited by I. Berg. New York: Columbia University Press, 1972.

Wilms, W. W. Public and Proprietary Vocational Training: A Study of Effectiveness. Berkeley, CA: Center for Research and Development in Higher Education, 1974.

Winter, G.; Beamish, E.; Moore, D.; Fadale, L.; and Naegele, B. Reality-based Evaluation for Two-year College Occupational Programs (Pilot ed.). Ithaca, NY: Cornell Institute for Research and Development in Occupational Education, State University of New York, 1975.

Wisler, C. E.; Burns, G. P., Jr.; and Iwamota, D. "Follow Through Redux: A Response to the Critique by House, Glass, McLean and Walker." Harvard Educational Review 48 (1978): 171-185.

Wolman, J. M.; Campbell, V. N.; Jung, S. M.; and Richards, J. M. A Comparative Study of Proprietary and Non-proprietary Vocational Training Programs (Vol. 1). Palo Alto, CA: American Institutes for Research, 1972. (NTIS No. PB-247 817)

Wolman, J. M.; Campbell, V. N.; Jung, S. M.; and Richards, J. M. A Comparative Study of Proprietary and Non-proprietary Vocational Training Programs (Vol. 2: Appendices). Palo Alto, CA: American Institutes for Research, 1972. (NTIS No. PB-247 818)

Worthen, B. R., and Sanders, J. R. Educational Evaluation: Theory and Practice. Worthington, OH: Charles A. Jones Publishing Company, 1973.

Yensco, W. R. "Comparing Engineering Graduates from Cooperative and Regular Programs." Engineering Education 61 (1971): 816-818.

Young, M.B., and Schuh, R. G. Evaluation and Educational Decision Making: A Functional Guide to Evaluating Career Education. Washington, DC: Development Associates, 1975.

Young, R. C.; Clive, W. V.; and Miles, B. E. Vocational Education Planning: Manpower, Priorities, and Dollars. Columbus, OH: Center for Vocational and Technical Education, The Ohio State University, 1971.